For Men Who Manage JUNE 1957

chemical processing

A PUTNAM PUBLICATION / Executive Management for Industry

Technical service a two-way street

SWAPPING KNOW-HOW...

- **Customer gets elastomeric sheet for high-temp-roll covering**
- **Elastomer supplier gains knowledge to tap new market**

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The chemical engineer looks at aid to under-developed countries 9

Kefauver-Patman amendment: poised blow to competition 10

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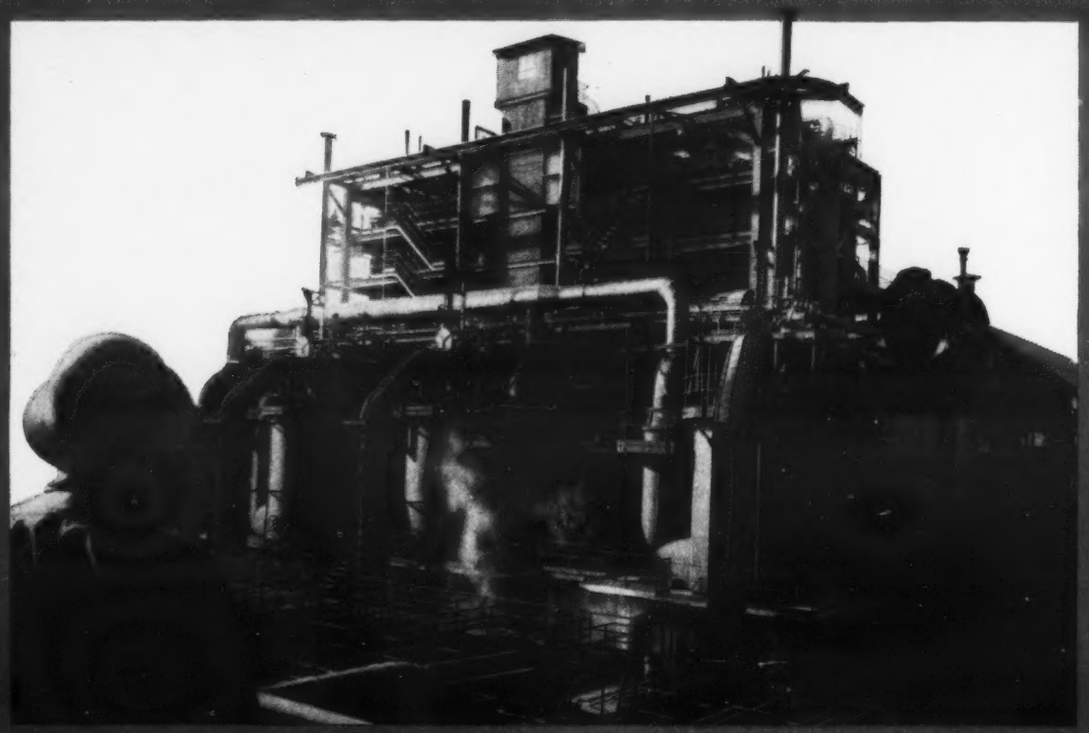

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THAT'S INTERESTING

A useful fish

Like the pig's squeal, the shark's growl is the only part of the animal that cannot serve a useful purpose. Sharkskin, tensile strength 5800 psi, makes a tough, durable leather; fins are used for soup; shark liver-oil is a valuable substance for tanning, steel tempering, and as a body for exterior paints. The carcass makes a high-grade poultry meal or fertilizer compound and the teeth serve well as costume jewelry. Meat, fresh and salted, is sold all over the world. (*Industrial Bulletin*)

"Fore"—Splash! It floats!

An Eastern manufacturer of custom sporting goods has developed a golf ball that is as much at home in the water as on the green. The aquatic pellet gives solid "click", soaring distance, and true putting line of a fine ball . . . and it floats! Now you only lose strokes, not the ball. (*Oakite News Service*)

Whopping-big vacuum cleaner

A 10-inch vacuum pipe 1000 feet long will be used to help recover $10 million worth of bat guano from a cave in the north wall of the Grand Canyon. The guano, dating back 60 million years, is only deposit of commercial importance ever discovered in North America. (*Denver Post*)

Fine for fur

Even the tenacious wolverine has yielded to progress. A blend of polyethylene and nylon fibers have proven superior to wolverine fur in almost all functional aspects, at least in parka hoods. At last reports the wolverine still planned on growing his own.

Turn to page 247

chemical processing

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

for men who manage

Vol. 20 June 1957 No. 6

CHEMICAL PROCESSING Magazine serves American industry wherever chemicals and chemical processes are involved.

Basic Chemical and Chemical Processing Industries

Industrial inorganic & organic chemicals (acids, alkalis, plastics, synthetic fibers, explosives, etc.)
Drugs & medicines
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Paints, varnishes, lacquers
Gum & wood chemicals (Naval Stores)
Fertilizers
Animal & vegetable oils & fats
Miscellaneous chemicals (cosmetics & toiletries, inks, insecticides, water treatment chemicals, etc.)
Paper & allied products
Petroleum, coal, coke-oven products
Rubber products
Stone, clay & glass products
Atomic energy establishments

Other industries utilizing chemicals or chemical processes

Food and allied products
Textile dyeing & finishing
Leather tanning & finishing
Metals & alloys
Machinery & equipment
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Water treating & purification plants
Government (incl. ordnance, missiles, etc.)

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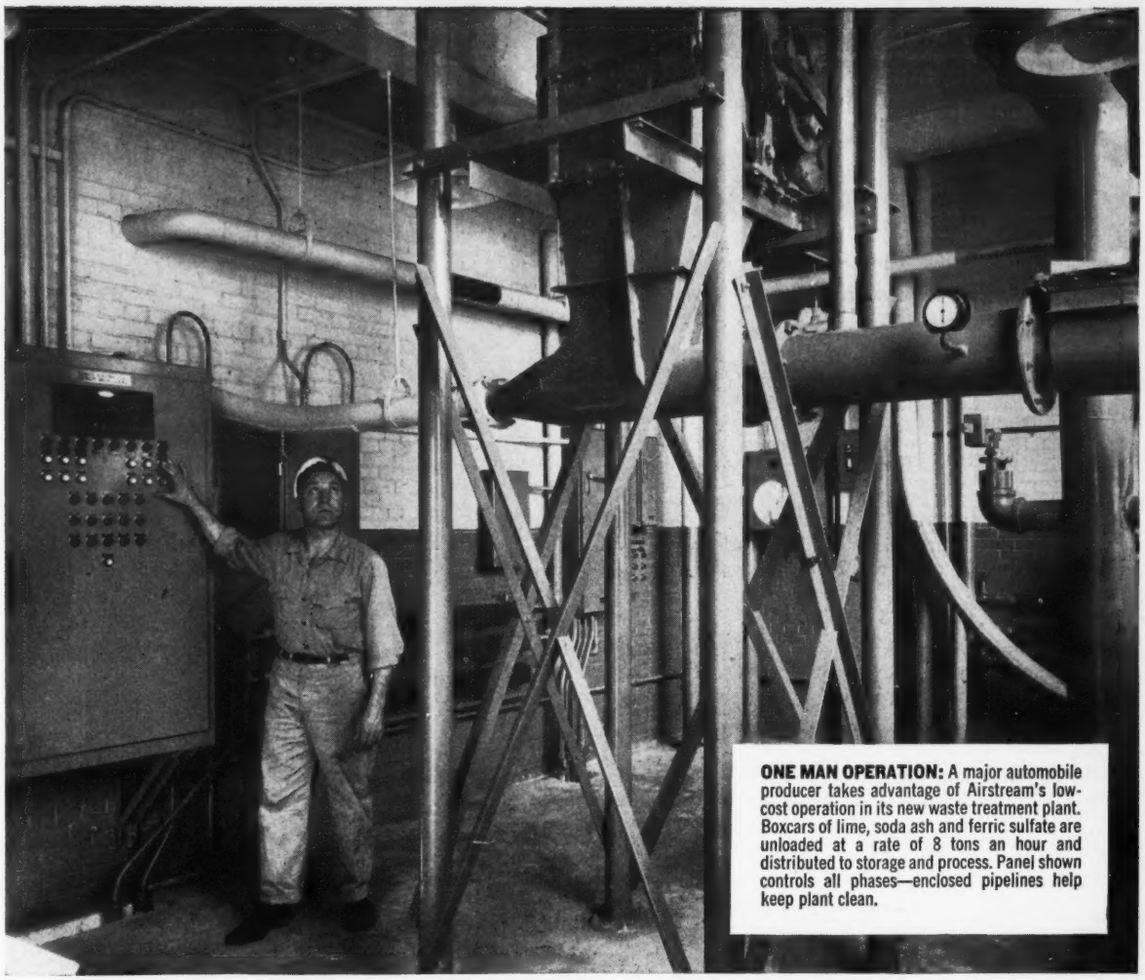

ONE MAN OPERATION: A major automobile producer takes advantage of Airstream's low-cost operation in its new waste treatment plant. Boxcars of lime, soda ash and ferric sulfate are unloaded at a rate of 8 tons an hour and distributed to storage and process. Panel shown controls all phases—enclosed pipelines help keep plant clean.

how to unload and distribute bulk chemicals automatically

■ Industrial process and treatment chemicals are usually purchased in bulk. Unloading these materials and conveying them to storage or distributing to process creates a major handling problem. Many conveyors have been devised to handle these materials, but for plants using as little as one carload a month none has as many cost-saving advantages as a Dracco Airstream Conveyor:

● **LOW LABOR COSTS:** Manual handling is eliminated. Central panel and unloading devices normally require only part-time attention of one man.

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Dracco Bulletin 529, "Airstream Conveyors", contains detailed information on equipment and uses. Shows examples. For your copy, write Dracco today.

DRACCO *airstream* conveyors
dust control equipment

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chemical processing

June 1957 volume 20 number 6

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THIS MONTH'S COVER

The arrow-shaped photographs on the cover point two ways . . . symbolizing technical service is a two-way benefit when supplier and customer share findings: Customer gets better product; supplier, know-how to develop a new market.

Photographs depict the two sides of tech service. Top: Tech service in action — Sheeting Hypalon for industrial roll covering in Du-Pont's Elastomers Lab. Bottom: Production follow-through — Calendering improved roll covering at Moreland Corp., Willow Grove, Pa. See report: page 17.

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- The product directory, pages 237 to 240, is your guide to all articles and advertisements
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over the editor's shoulder

The Business of Chemicals

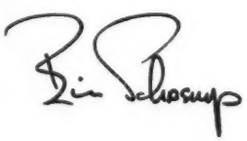
This issue marks the twelth month that Chemical Business has been included as a regular feature of CHEMICAL PROCESSING magazine. And in the past year it has grown to its present form of a "magazine within a magazine."

But Chemical Business was first published almost five years ago under the name Chemical News-briefs. It had a limited circulation and was designed to acquaint readers in non-technical areas of the chemical industry with the significant technical developments reported each month in CHEMICAL PROCESSING.

And as CB grew, it became more and more apparent that CHEMICAL PROCESSING's readers were growing increasingly interested in the *business* of the chemical business. It was then a natural step to include it in CHEMICAL PROCESSING.

And as the needs of our readers continue to grow, and as the chemical industry becomes more and more complex, Chemical Business will continue to keep pace with these needs. It will continue to report the most important activities and trends in the field . . . written to help men like you get the most out of your reading time.

The Editors are constantly on the lookout for ways to make Chemical Business more valuable to its readers. And we'll welcome your continued suggestions and comments



Chemical Business Editor

BAKER announces an ALL NEW PNEUMATIC-TIRED FORK TRUCK

Trail Axle
Double-yoke construction for extra strength. Longitudinal mounting in jumbo rubber blocks to provide lateral oscillation and absorb ground shocks.
Power Unit
Heavy-duty industrial gas engine with extra stamina for continuous rugged service. Features maximum fuel economy—minimum maintenance.
Power Steering
Standard at no extra cost. Effortless full-time power steering means less operator fatigue, greater safety and more work per day.
Lift and Tilt Controls
Conveniently located and easily manipulated levers for positive control of hydraulically-operated hoist and tilt motions.
Drive Axle & Transmission
Rugged Timken industrial truck axle and heavy-duty transmission, with two speeds, forward and reverse.
Single or Dual Wheels
Large pneumatic tires on drive wheels, with deep treads for maximum traction. Dual wheels available for extra heavy duty, better flotation and added stability.
Brakes—Hydraulic self-energizing, full-floating type—in drive wheels. Self energizing in both forward and reverse. Duo-grip, two-shoe independent parking brake on transmission shaft.
BAKER

This Baker FGF-40, 4,000-lb. YARDLOADER, first in the new line of Baker pneumatic-tired gas fork trucks, has many new design features for greater maneuverability and more dependable performance. It is *fast*—top speed with load, 8.6 mph. It is *compact*—only 48 inch wheelbase, and minimum overhang—*and only 79 inch turning radius.* Low center of gravity makes this possible without sacrificing stability.

Absence of cowl provides maximum visibility. Power steering and many other driver conveniences make it one of the easiest handling fork trucks—and one of the safest. Full 130-inch lift, with single or dual cylinder. Truck-loading mast available with 110-inch lift and 71-inch overall height . . . For complete information ask for Bulletin 1382.

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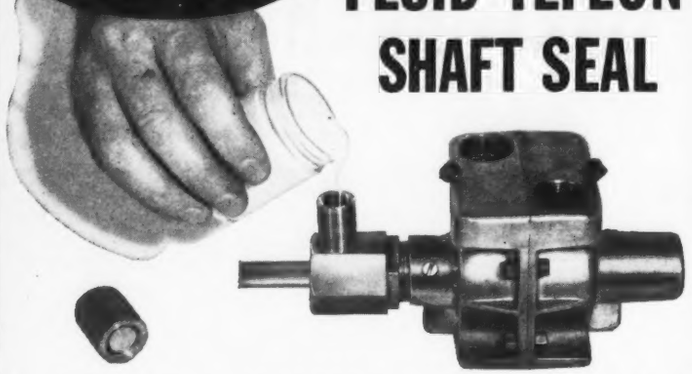
new

FLUID TEFLON SHAFT SEAL



FOR CORROSION RESISTANT ECO ROTARY PUMPS

Here is a seal expressly designed for corrosive and hazardous service. It eliminates the usual pumping problems encountered with conventionally packed stuffing boxes or mechanical seals. Constructed of Carpenter 20 stainless steel throughout, it utilizes a fluid Teflon dispersion as a hydraulic sealing medium.

This seal is available from stock as optional equipment on all new pumps and can replace standard stuffing boxes on all existing Eco rotary pumps in the field.

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Eco specializes in the manufacture of small corrosion-resistant pumps. These are available for immediate delivery with housings of 316 and Carpenter 20 stainless steel, Hastelloy C and Monel; impellers of Teflon, Hypalon, Neoprene and Formica.

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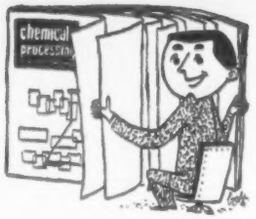


looking ahead to next month . .

Corrosion Control section featured in July

Dr. W. F. Fair, Jr., President of the National Association of Corrosion Engineers this past year, will lead off CP's Fourth Annual spotlighting of the regular Corrosion Control section. Dr. Fair, Coatings Consultant for the Koppers Company, has chosen for his subject: "Corrosion — Training and Trends." His comments should be of major interest throughout the chemical field.

And this year our featured Corrosion Keys will be on titanium and zirconium. Last year's Keys, on properties of aluminum, aroused tremendous enthusiasm, and we think that this year's data will be equally well received. The titanium Keys were developed by D. L. Macleary of Du Pont, and those on zirconium by W. E. Kuhn, The Carborundum Company.

The section will also feature a corrosion tester which provides visibility of the specimen while the system is in operation. And we'll have condensations of recent technical papers on corrosion control.

William Van Vliet Bacon, recognized expert on corrosion problems, cooperated with us in the development of a number of case-history stories at his plant, Food Machinery's Westvaco Chlor-Alkali Division at Charleston, W. Va. One tells how Monel cladding withstands aggressive corrosion and abrasion from 50 percent liquid caustic soda containing suspended silica.

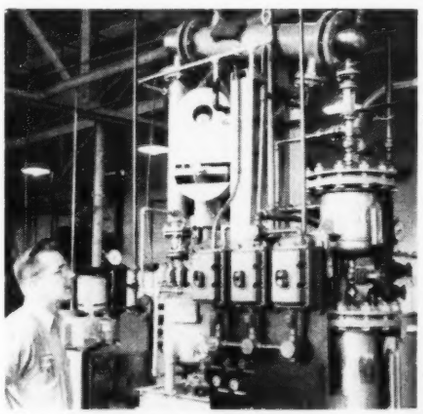
Other features in the section will be more case histories, articles on glass, plastics, alloys, coatings, cathodic protection . . . all ideas to help your battle with corrosion.

Jack-of-all-trades pilot unit

One of the most interesting developments in pilot units is a small stainless steel plant that performs practically *all* pilot operations in pharmaceutical chemistry. The unique unit consists of a ten-gallon reactor, a three-gallon decanter, a single-pass condenser, and a five-gallon receiver.

First installation of the unit is at Lakeside Labs., Milwaukee, Wis. Unit is made to Lakeside's own specifications. It processes heat-sensitives under vacuums of 50 microns Hg.

Assistant Editor Bill Clarke visited Lakeside to get details of the unit and its operation. Next month's Laboratory section tells how it is used and how it has benefited Lakeside's operation.



Engineer Anthony Mason supervises pilot production of antispasmodics at Lakeside Labs with recently developed pilot unit

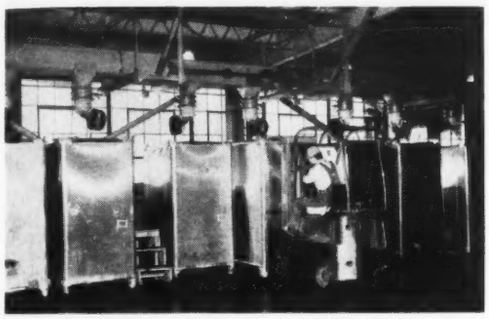
Flexible handling system meets changing process requirements

Goodyear Tire & Rubber Company of Kansas, Topeka, Kan., uses 140,000 pounds of carbon black daily. In order to effectively meet changing requirements for formulations involving six different grades of carbon black, a completely flexible handling system was an absolute necessity.

Goodyear installed a system of mobile bins, each holding 2000 pounds of carbon black. They are moved through the plant by lift trucks, can be stacked for storage, and emptied into the process as material is needed.

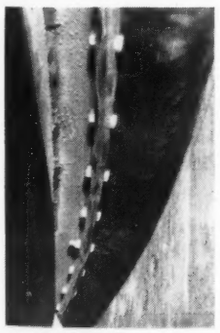
Here's a quick preview of features you'll find in July CHEMICAL PROCESSING

Next month's Material Handling section tells how Goodyear has cut material costs considerably through purchasing carbon black at a bulk discount, as well as reduced in-plant handling costs.



Lift truck moves bin, containing 2000 pounds of carbon black, from loading station

Floating-roof seal cuts product loss, maintenance



Liquid-filled seal (shown from underside) cuts product evaporation, seals against moisture, requires no maintenance

Continuous movement of floating tank roofs usually means considerable shoe wear and maintenance for metal-shoe roof seals. There is also product loss due to evaporation, or moist air is drawn into the tank . . . a potential source of corrosion.

At Atlantic Refining, Philadelphia, an experimental installation of a roof-seal system which uses a liquid-filled tube as a seal around the edge of the roof has all but eliminated these conditions.

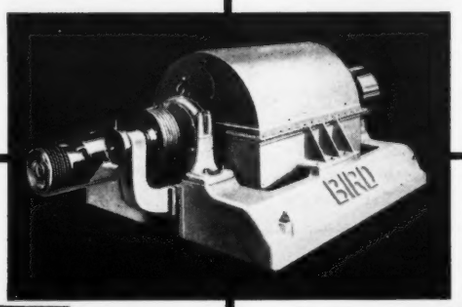
Because seal eliminates vapor space between stored product and tank roof there is little chance for evaporation or moist air entry.

Assistant Editor Ted Wett visited Atlantic's refinery and talked to Superintendent Dr. H. V. Hume. His story on the maintenance-free tank seal will appear in next month's Engineering and Maintenance section.

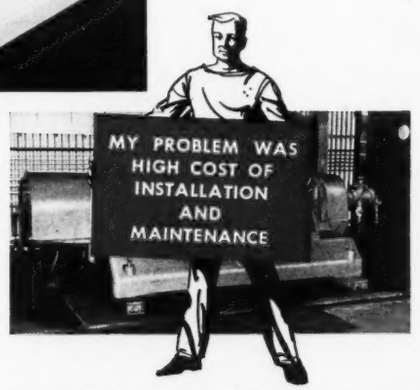
Each had a different filtering problem but this BIRD solved them all

The Bird Continuous Centrifugal Filter takes out solids from half inch to half micron, mixed in any proportion; slurries can be 2% solids up to maximum pumping consistency; input volume can vary all over the lot as long as peak capacity is not exceeded.

The BIRD handles hot slurries without flashing, blinding of filter media or any need of "back washing." Feeds can be minus 100° F or plus 300° F. Both solids and effluent remain within a few degrees of input temperature.



The BIRD is a self-contained, automatic unit that usually runs for months without attention beyond routine lubrication. It requires no pre-thickening apparatus, no storage tanks, no vacuum, no filter media, no complex controls.



The BIRD keeps the filtration process completely under cover. It is readily made vapor tight. Filtering is no longer a sloppy, messy or wasteful operation.

Maybe you have a filtering problem that differs from any of these. Even so, the range and versatility of the BIRD merits investigation whatever the conditions.

The Bird Research and Development Center has the facilities to help you solve the problem *in advance* of your investment in equipment. Why not use them.

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- Bird-Prayon Continuous, Rotary, Horizontal Vacuum Filters
- Bird-Young Continuous Rotary Vacuum Filters
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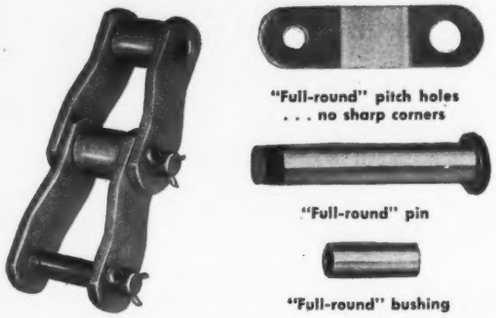
"Stress raisers" eliminated by Link-Belt LXS chain design

LXS "FULL-ROUND" DESIGN



"FULL-ROUND" DESIGN eliminates stress concentration points. Heat treatment of all parts adds even greater strength and extra wear life to selected steels. Accurate control of these processes avoids brittleness, poor wear values and low tensile strengths . . . and assures uniformity.

Large pins, bushings mean ample live bearing area for long life

For long life under severe conveyor and drive conditions, Link-Belt LXS chain provides extra strength, increased wear resistance and wider application flexibility. This fabricated steel roller chain incorporates many advanced design and manufacturing refinements, resulting in superior ruggedness and accuracy.

Eliminate weak points

"Full-round" design does away with stress concentration points most frequently subject to failure . . . provides maximum live bearing area between pin, bushing and sidebars. As a result, stress is distributed evenly, increasing chain life.

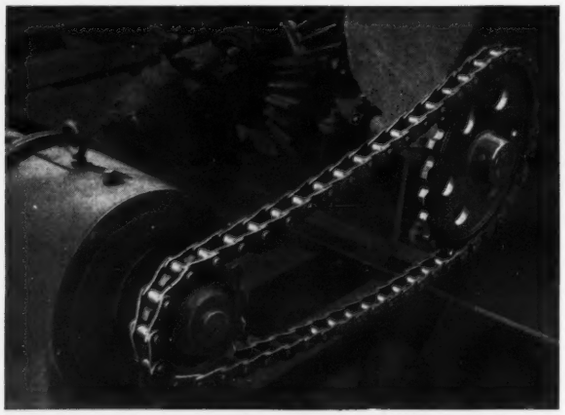
Pins and bushings are accurately sized for controlled press fit, preventing rotation in sidebars. Made from selected bar steel, sidebars are carefully machined for proper pitch hole size and for maintaining firm, tight press fit of pins and bushings. This assures close control of pitch and proper chain length after assembly.

Hardening extends life

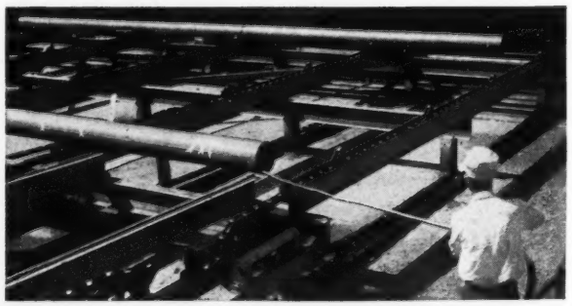
Another Link-Belt long-life extra is the controlled hardening of selected steels used in the manufacture of LXS chain. Pins, for example, are made from a tough steel, specially treated for high strength in shear and for maximum wear value. Bushings are properly hardened to shrug off shock and resist wear.

Rollers are accurately machined to assure proper operating clearances and free-rolling action. Controlled hardening gives them the necessary resiliency and durability.

LXS especially popular for exposed drives, high impacts



Link-Belt LXS chain is the long-life answer for exposed drives, abrasive and high-impact conditions. Its large, live bearing area reduces cutting action of abrasives because load is spread over a broad area.



LXS chain provides extra strength, wear-life for heavy-duty conveying

Link-Belt LXS chain has real stamina—as shown in this conveyor application for handling 1000-pound, 40-foot lengths of steel pipe. Thanks to accuracy of pitch and attachment spacing, plus close matching of multiple strands, LXS has the added strength and wear life for the extra-long conveyors so popular in today's move to mechanization.

HEADQUARTERS for chains, sprockets and other Link-Belt conveying and mechanical power transmission products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor.

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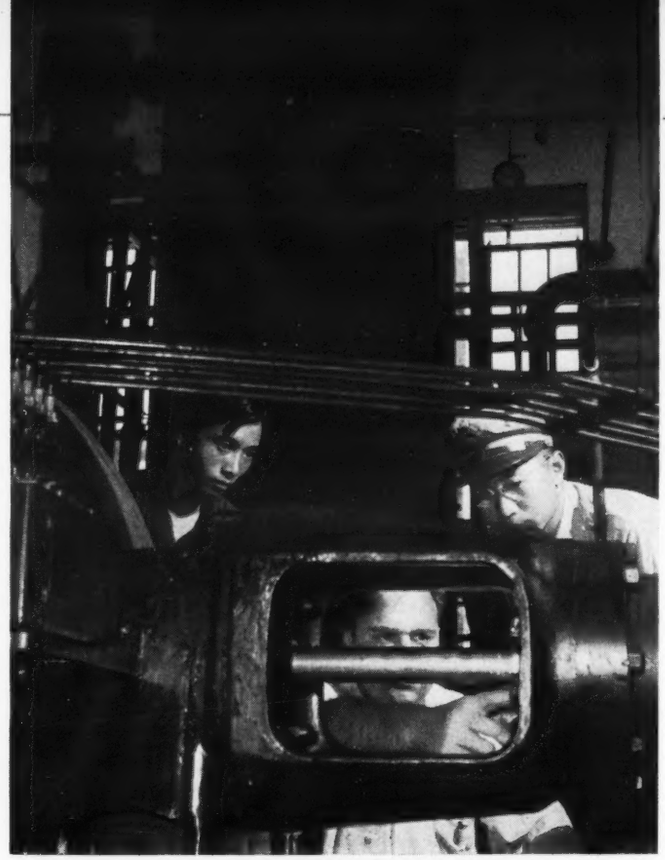
JAN M. FANTO has recently returned from nearly five years in Israel, Greece, Cyprus, Turkey, and many countries of Western Europe. He has been responsible for supervision of design, procurement, and start-up of heavy chemical and fertilizer plants.

He has previously worked as a chemical engineer and chemist in the USA, Canada, England, and pre-war Czechoslovakia. At present, Mr. Fanto is a chemical engineering consultant in New York.



Photo—International Cooperation Administration

Typical of the aid chemical engineers can give is at the $23 million ammonium sulfate plant in Kaohsiung, Formosa, which is going on-stream late this year

The chemical engineer looks at technical and economic

AID TO UNDER-DEVELOPED COUNTRIES

JAN M. FANTO, Consultant
New York, N. Y.

As engineers and management in the chemical processing industries, we are called upon to play a major role in world development. It should be very clear in our minds just what are the problems that face us, and the consequences of the various solutions to these problems.—Editor's Note

THE question is not, "Will under-developed countries develop?", but rather, "By what means will they develop?"

People who can barely keep body and soul together *must* obtain capital if their areas are to develop. If they cannot obtain economic aid as loans or investment from foreign countries, they will adopt a system that will forceably extract capital from the population. It appears that many peoples are so interested in development that they will accept a totalitarian system to achieve that end, if it looks like the only way that is open to them.

Economic aid has two facets: financial and technical assistance. Our country is concerned with both, but we as technical men are probably more interested in how we can give technical aid.

First Phase: Basic Development

All assistance should, at first, be on a "no strings attached" basis. No matter how altruistic the intentions of an individual country, the motives will be questioned, and other countries who are not giving aid will fan the fires of suspicion. That is why the United Nations is such a good medium for aiding under-developed areas.

As far as technical aid, the United Nations spent about $30 million during 1956 on their Expanded Program of Technical Assistance. All special UN aid programs financed by voluntary contributions, including technical assistance, ran about $101 million during this year. Now there is a new fund envisaged within the UN Economic and Social Council (ECOSOC) which, in addition to technical aid, has the objective of establishing an international economic development fund. Called the Special UN Fund for Economic Development (SUNFED), the fund, if established, would furnish financial aid to improve the economies of under-developed countries, by providing funds for non-self-liquidating projects (health, education). A special committee analyzing governmental views on this subject will make its final report at the 24th session of ECOSOC in Geneva, Switzerland, in July, and the 12th session of the General Assembly in New York in September. Both meetings are open to all interested persons, as are most UN meetings.

Second Phase: Industrial Development

Once the basic framework — roads, communications, health and educational programs — has been laid, then industry can develop.

Private enterprise, rather than public, is best suited for the development of most industries. Medium- and small-size companies, even more than the "giants," should be encouraged to carry out market research in the less-developed countries to find their most urgent needs, and then plan accordingly. Companies can join hands with local interests to further develop local management, technical personnel, and capital requirements.

But in making decisions to enter the foreign market, our companies should not compare these foreign operations on the same basis as their American ones. They cannot look to immediate large financial returns, and profits will be lower than those in their

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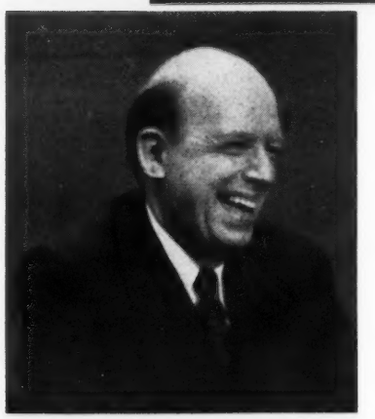
The proposed Kefauver-Patman amendment to the "good faith" pricing legislation will, says MCA Counsel Claude E. Hobbs, tend to stifle competition among US chemical makers, make it difficult for them to compete with foreign companies. Here's how the amendment can affect you and your company, and an explanation of the MCA's position.

Millstone for ch

CLAUDE E. HOBBS,
Counsel
Manufacturing Chemists' Association, Inc.

Co-sponsor of the amendment, Senator Estes Kefauver (D. Tenn.), teams with . . .

Representative Wright Patman (D. Texas), one of the writers of the original legislation, in efforts to bring the bill before Congress



Herbert Brownell's Department of Justice has gone on record as opposing the bill

TWO bills are under consideration by the Congress in Washington today that, should they become law, may well have a definite effect on your industry, probably on your company, and possibly on you as an individual. The bills aren't the kind that make headlines in the daily papers; they go under the simple designations of H.R. 11 and S. 11. Their purpose is to amend the Robinson-Patman act, part of the existing antitrust law structure. Their effect could be to seriously stifle competition in all parts of the chemical industry.

The bills came up in the last Congress and passed the House of Representatives 393 to 3. Fortunately, opposition from industry, including the MCA, in the Senate helped forestall final action at that time. But like the proverbial bad penny, the Kefauver-Patman Bill, as it is called, is up again before the present Congress. Senate Antitrust and Monopoly Sub-committee hearings on S. 11 have already been completed.

I have said it would affect your company, and perhaps you directly. I've said that the MCA and other industry groups have opposed the bill. I'll now try to explain what the bill provides and what the danger to the chemical industry is, as we see it. Stay with me. What follows isn't simple, but it is important!

Let's say the telephone rings in your sales manager's office. It's his salesman in Red Oak, Minn. He's calling from the office of the Apex Box Company — your good and valued customer of twenty years standing. Your top competitor has been in to see Apex and, notwithstanding the service you give them, they have been offered a deal too good to turn down. The salesman's ques-

chemical competition:

The Kefauver-Patman Amendment

Claude E. Hobbs took his law degree from the University of North Carolina. He later took work in law of trade regulation at George Washington University. He was admitted to the North Carolina bar in 1940, admitted to practice by the US Supreme Court in 1949, and to the District of Columbia bar in 1952.

Hobbs was instructor at Washington and Lee University in 1940 and 1941. He joined the Department of State in 1941.

He was later an attorney for the Federal Trade Commission.

Hobbs subsequently became Executive Secretary of subcommittees, US House of Representatives. In 1951, he became Assistant Parliamentarian for the House.

He is now Counsel for the Manufacturing Chemists' Association.

tion — "Can we cut our price to meet the competitor's price?" Now, when that situation occurs under the present law, it is simply a matter of your sales manager getting out his pencil and doing a little figuring on costs and prices. This done, he quickly instructs the salesman to meet the competitor's price. The deal is made and the new contract signed.

This kind of situation occurs every day throughout our country. Free, competitive enterprise is one way of describing it.

But, if the Kefauver-Patman Bill passes the Congress and becomes law, the scene in Red Oak would be somewhat different.

When the sales manager gets the salesman's call he *may not* be able to cut his price without being prepared to offer *that same reduced price* to every similar account in the "area" . . . and an "area" may be a city, a state, or even the whole country.

If he doesn't offer the same reduced price to all of his customers who compete with each other, he may be in violation of the new law. In addition, your company may find itself on the bad end of a treble damage suit filed by a customer who didn't get a similar price reduction. More than that, if your sales manager even met the competitor's price by absorbing freight charges between your plant and Red Oak, this, too, may be in violation of the new law.

Startling? Yes indeed. Here's how it comes about.

Present law

Under the present provisions of the Robinson-Patman Act, a seller charged with "selling at discriminatory prices" can defend his action by showing that he was simply meeting the lower price of his competitor. Of course, he must act in "good faith," that is, he must have some reliable knowledge of his competitor's offer. If the Kefauver-Patman amendment becomes law, *this defense would be imperiled!* Your company would be legally safe in meeting a competitor's price *only* if it made the same price available to all customers who compete with your Red Oak customer — and conceivably the Red Oak man could have 100 competitors all of whom are your customers. Consider what this would do to your company's price structure!

What I have outlined up to now is a simple, in fact, an oversimple view of the situation. I'd like to offer you a little bit more of the meat of the matter.

The Robinson-Patman Act as it now stands prohibits price discrimination where the effect of such discrimination "may be substantially to lessen competition or tend to create a monopoly." Section 2 (b) of the present Act, however, says that a seller may defend himself against allegations of discriminatory pricing by showing that the discrimination "was made in good faith to meet an equally low price of a competitor."

In what is termed the Standard Oil of Indiana Case, the US Supreme Court ruled that this "good faith" meeting of a lower price was an absolute defense. That's why your sales manager can freely cut price to meet competition. The Federal Trade Commission argued otherwise in the Standard Oil Case and lost. The Kefauver-Patman Bill is an attempt to write the FTC's losing view into law.

Effect on small companies

A major purpose of the antitrust laws is generally regarded as being protection of the small businessman from the "corporate giant." Let's see how this would work out under the proposed amendment.

Let's say you run a little chemical company serving a three-state area. You have ten customers and you sell your product to all of them at $2.00 a pound. A big company in your industry has a similar product, but until now they haven't sold in your area. They move in. Working through a new independent distributor, they offer your top customer a price of $1.80 a pound. Under S. 11 you couldn't cut your price to your top customer without running serious legal risks, unless you also cut it to the

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other nine customers in the area. So, unless you want to expose yourself to serious lawsuits, you are left with the "Hobson's" choice of losing your top customer for fear of violating the law, or reducing your price to $1.80 to *all ten of your customers* — a move that might be financially ruinous to you. It is clear from this that, far from stimulating competition and protecting small businesses, the proposed amendment to the Robinson-Patman Act would inevitably tend to stifle competition and hurt small businessmen.

So far I've dealt in hypothetical situations. Let me give here the views of Augustus H. Eustis, president, Virginia Smelting Company. When he appeared recently before the Senate Subcommittee, Mr. Eustis said, "The lot of the small company seems to be becoming more difficult. I firmly believe that this bill, if enacted, will make it harder for small companies like the Virginia Smelting Company to continue to exist."

Other small companies have gone on record with the same view. They say that by denying their present right to compete, you take from them a major element that is fundamental to their existence.

Protection for big companies?

The implicit perils in the seemingly innocent bill are as consequential to large companies as to small. Take, for example, a firm of some size operating nationally and shipping its products from six geographically dispersed plants. Today, one way of selling to a distant market or meeting a competitor's lower price is by absorbing part of the freight cost. Under the proposed amendment it would be impossible for companies to know whether they could legally absorb part of the freight costs of products sold to distant customers.

The result of passage of H.R. 11, according to many authorities, would be to create localized monopolies in many manufacturing lines. This could mean considerable plant relocating and possibly closing down or reducing output in what are now major plants. This would, in fact, be a trend away from the economic distribution of new plant facilities near available sources of raw materials and energy, but remote from large consumer markets

Foreign competition

Another facet of the problem posed by the Kefauver-Patman bill is its probable effect on the ability of US chemical manufacturers to meet foreign competition in this country.

For example, and this is quite common, a chemical manufacturer abroad finds himself with a large inventory, or he needs dollar exchange, or he just wants to pick up some US business. He offers one of his products on the US market at a bargain price. Frequently, he makes this offer to a single customer, so there's no question of *his* discriminating in price illegally. Today a US producer can, if he wants to, cut price to meet this competition. Under the Kefauver-Patman legislation he wouldn't be able to without danger of violating the law . . . unless he cut prices to *all* customers in the area.

"Dumping" of foreign exports in the United States is problem enough without curtailing US manufacturers' right to compete if they so choose.

If the Kefauver-Patman idea were allowed to develop fully, US manufacturers would inevitably drop the product lines favored by foreign producers, and the United States could easily find itself where it was 40 years ago — dependent on foreign sources for many critical chemical materials.

I would like to repeat here what our Association told the Senate Subcommittee when our General Counsel appeared in opposition to the bill. Our view of the effect of the Kefauver-Patman Bill can be summed up in five points:

- Competition in the manufacture and sale of chemicals would be lessened.
- The bill would create complete uncertainty as to when a competitive price can be met.
- Small manufacturers would be hampered in meeting competition from large mass producers or firms who produce their own raw materials.
- Sources of supply for buyers of chemicals would be limited.
- The development of the chemical industry in areas close to natural resources and away from large centers of population would be retarded.

Chance of passage

Prognosticating on the fate of any given piece of legislation is always chancy business. At the moment, opinion is divided on whether or not the Kefauver-Patman Bill will get through the Congress.

Strong industry opposition to date has weakened the prospect of passage. The Department of Justice has testified that this is a bad bill, so there is the possibility that even if passed by Congress the bill might be stopped by Presidential veto.

However, you can be sure that Senator Kefauver and Congressman Patman will push hard for favorable action.

About now you might be asking, "What can I do about it?" Here are a few suggestions:

- Inform yourself on your company's appraisal of these bills. I'll be glad to send you a copy of the proposed amendment, along with the complete statements of Henry Fowler, General Counsel of the MCA, and of Mr. Augustus H. Eustis, President of Virginia Smelting Company.
- See that as many of your colleagues as possible are alerted to the problem. If you'd like reprints of this article they are available at cost.
- Enlist the support of your employee group. Explain the situation to your foreman, run articles in your employee publication, include a review of the situation in management development courses.
- Bring the problem to the attention of business and civic groups. If they want to pass resolutions against the bill see that your Congressmen learn about this.
- And . . . write your Congressmen. They sincerely want your views. Encourage others to write, too. Don't however, start a postcard barrage; have each individual write his own letter in his own way.

Another question you might have is, "If this bill is so bad, how in the world did it ever get started?" The Kefauver-Patman Amendment was drawn up principally to protect retail gasoline stations and certain other retail establishments from discriminatory price-cutting pressures.

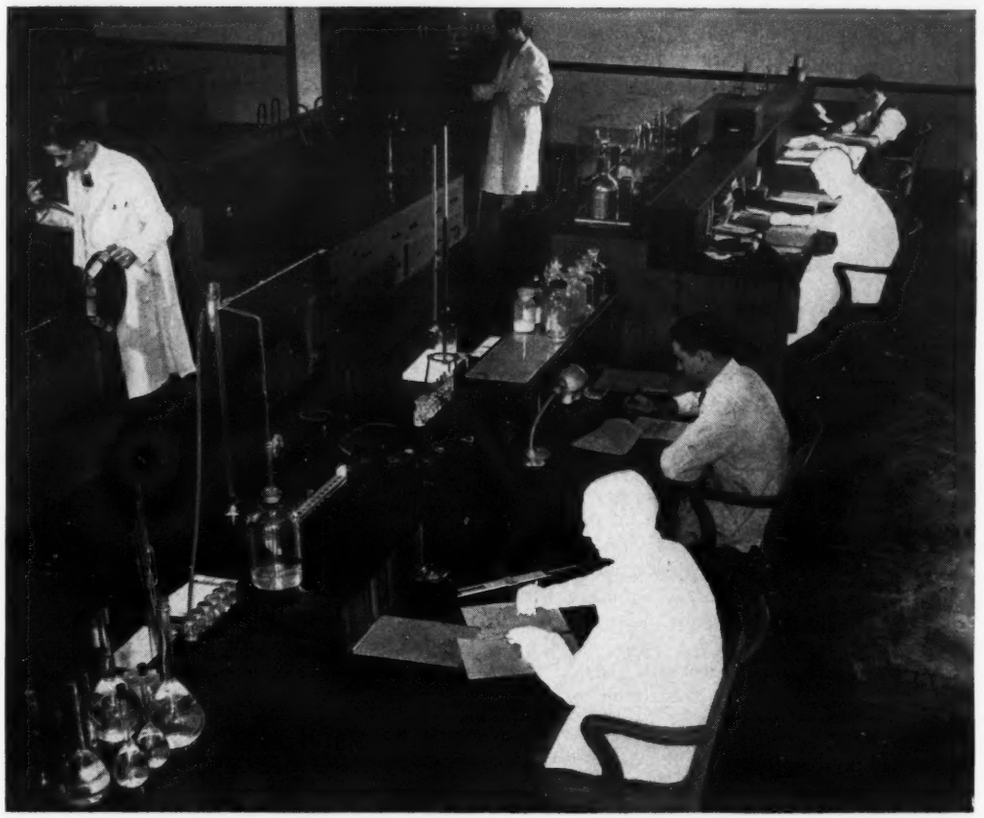
It was sped through the House of Representatives as a measure to protect small business. In attempting to supply this protection the sponsors of the bill apparently failed to see what it would do to manufacturers. It may well be that some kind of legislation is necessary to protect certain retail establishments, but as MCA General Counsel Henry Fowler said in his statement to the Senate Subcommitte, "If, after carefully weighing the advantages and disadvantages to competition and the economy that may be a consequence of the proposed legislation, you become convinced that the legal status quo cannot be maintained, surely some better means of preserving competition and avoiding a monopoly in the distribution of a few lines of products can be devised than by restricting competition in production and sales at the manufacturing level generally."

Single reprints of this article are available without charge from the MCA. Bulk quantities available at cost. Write to George M. Worden, Director of Public Relations, Manufacturing Chemists' Association, Inc., 1625 Eye Street, N. W., Washington 6, D. C.

Copies of the proposed Kefauver-Patman amendment are available from Claude E. Hobbs, MCA, . . or check 3808 on form opposite last page.

Why A SCIENTIFIC MANPOWER SHORTAGE?

CHRISTOPHER L. WILSON, Professor
University of Notre Dame
Notre Dame, Indiana



WHAT I am going to say will irritate some people but will please others. I am primarily concerned with the problems of supply and demand of chemists — since I know most about them — and to a lesser degree I am also concerned with physicists and chemical engineers. My least concern is with engineers in general. Yet I have heard their problems in this connection are very similar to those of the chemist.

Let me digress a little and become philosophical. Our modern society is very complex and needs many talents for its welfare — hence our complex school system and curricula. For the talent it seeks society pays well, both in financial remuneration and prestige afforded the possessor. Society pays most for the talent it cherishes most. Since scientists are not well paid, it would be easy to jump to the conclusion that society does not need the scientists. Of course, this is nonsense. The anomaly is caused by the failure of the scientist to present to the public just what he does and why he does it.

The job of the scientist, particularly the research scientist, is obscure to the lay mind. Most scientists and engineers have at one time or another tried to explain to a relative or friend just what they do in their work — with little success. I would go much further and say that nobody really appreciates the function and philosophy of research execpt those who have done it themselves. In spite of this obstacle to understanding, the scientist must, nevertheless, try and present his case to the public.

The medical man deals directly with human welfare, and his role in society is easy to appreciate. On the other hand, when the scientist does enjoy publicity in the press, his activities are usually associated with extremes of good, as nylon or polio vaccine, or with evil, as nerve gases or atomic energy. It is extremely rare to find the name of a chemist or biochemist associated with development and manufacture of antibiotics or other drugs. The praise usually goes to the manufacturing corporation and administering doctor.

Perhaps a scientist should expect better public relations through his societies but, by and large, this is not in evidence. Most of his public relations come from the industries that employ him. The emphasis is not what the individual is doing for society but what industry is doing for society. The public should be told the truth that progress and discovery originate in the minds of individuals. Industry supplies the machine so that these new things can be manufactured for the comfort of many. The question of public relations is important because it is a factor in the supply and demand of scientists.

Let us look more closely at financial rewards. The Ph.D in chemistry or physics now starts in industry at about $600 per month. The bachelor gets about two-thirds of this. Starting salaries are a very important indication of the present greater demand for scientists, and they have risen about $100 in the past five years. If we compare these figures with those in 1925 — and 1925 is picked as the only previous stable era not adversely influenced by war or depression — we find then the Ph.D received about $250 or $300 per month to start.

In 1925, however, the dollar was worth at least two and one-half times what it is now. You can see that the research man is worse off financially than

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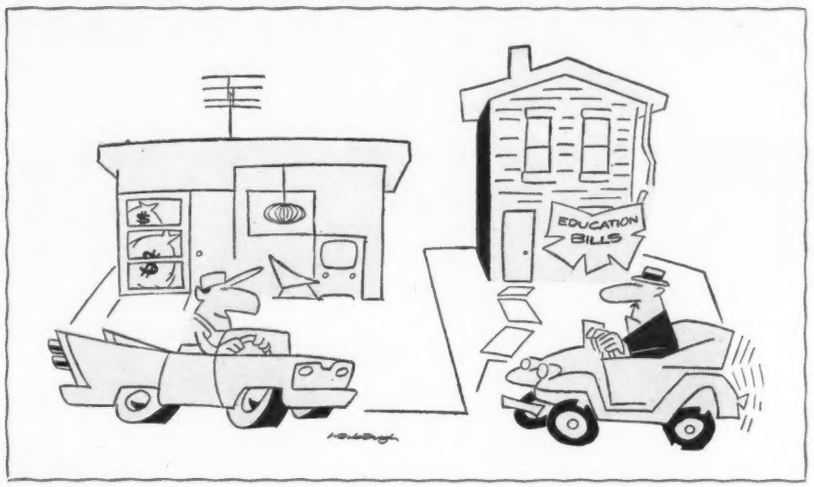
WHY A SCIENTIFIC MANPOWER SHORTAGE? *Starts on preceding page*



. . . the increase in the standard of living has almost entirely gone to raise the standard of living of the hourly paid worker

he was in 1925. In contrast, the doctor or surgeon has more than doubled his dollar take over the same period, keeping pace with inflation. But the biggest rise of all is in the hourly wage rate of the unionized skilled worker who has trebled his wage rate and acquired various fringe benefits. The unhappy conclusion is that the increase in the material standard of living, about which much is said with almost religious fervor, has almost entirely gone to raise the standard of living of the hourly paid worker.

The shortage of scientists at the present time is reflected not only in today's increasing inflation of starting salaries but also in other ways. In Atlantic City at the American Chemical Society meeting in September, 1956, recruiting personnel outnumbered job applicants almost two to one. This results in chemists receiving as many as ten or twelve job offers, then making four or five trip visits, and finally — perhaps — picking the company where father works.

For a chemist to earn more dollars he has to enter more spectacular parts of industry as administration

Students are now interviewed in college years before they graduate. Cases are known where promise of job acceptance at some later date is met by a part salary payment up to the time of leaving college. It has even been said that some companies have given bonuses to their recruiting personnel for successful activities. At least one company flies its potential employees around in a private plane. Presumably, this is to impress them, but what is the result when the company will scarcely sanction a coach fare to scientific meetings? The activity gives quite an unfair picture of industry. Worst of all, it does nothing to alleviate the shortage but actually aggravates it.

In the New York Times for November 27, 1956, recruiting of technical people was captioned "Industry's Annual Manhunt". In the same article a placement officer in an Eastern college was quoted as advising interviewees not to talk about starting salaries since these are uniform anyway. This is, of course, true since industry knows full well that a price war hurts everybody.

But the important question not asked by the student is about expected raises after employment. I know of three large corporations which have suffered internal agonies during the past five years because the inflation in starting salaries exceeded the annual raises of too many older employees. This demands large expensive internal adjustments of wage scales.

The research man in industry can seldom expect to earn more than ten to fourteen thousand dollars per year. We have been told recently of exceptions. Scientists have been encouraged to stay at the bench and become senior men with pay and dignity usually awarded administrators. I know of such exceptions but I doubt whether there are as many as fifty in the entire chemical industry.

Thus on the whole, the scientist can expect to double his salary, whereas an administrator expects to quadruple his initial salary. For a chemist to earn more dollars, he has to enter the more spectacular but less creative parts of industry in sales or administration. The salesman's earnings for the company are immediately obvious to management, but the research man's efforts are scarcely discernible for perhaps years. Industry could stop all research tomorrow and the evils would not be apparent for a long time. Research is done frequently because businessmen imitate their competitors. These factors are also important in consideration of the shortage because industry pays least for the activities it appreciates least.

With the remarkable growth of the chemical industry in the past 30 years, its expansion has been about ten fold. The supply of college graduates has kept pace with this — rising from 40,000 in 1910 to 400,000 in 1950. Over the same period, the population rose from ninety to one hundred and fifty million, scarcely double. These figures mean that the proportion of young people graduating from college has risen more rapidly than the population.

In 1955 the number of graduates had fallen to only 270,000. This deficiency has persisted and the cumulative shortage has become progressively worse. What are the reasons for it? The proportion of students going into science has remained steady at about 10% over the years. Consequently we cannot, as is done sometimes, blame decreased interest in science as the cause. But we can blame a birthrate drop combined with a big reduction in the number of immigrants.

In the ten years 1921 to 1930, the decade before the depression, there were 19.5 million births, 4 million immigrants, and 12 million deaths, with a net population gain of 11.5 million. During the depression decade of 1931 to 1940, births fell from 21 to 17.3 per thousand, number of immigrants to a half million, and deaths remained steady. Overall result in the depression decade was a net increase in population which was less than half that in any other decade.

The labor force now in short supply is made up of those born during the depression decade. The shortage was felt first in 1950, has been accumulating since — and getting worse. Another factor is the direct loss of adult immigrants with higher-than-average levels of skill. These represent an immediate loss which began in 1931 and steadily grew in the suc-

ceeding years. Of course the loss was not apparent in the depression decade. Neither was it apparent in the war years since everything was short anyway. But the number of immigrants has never risen to its former values and the cumulative shortage in supply is now aggravating our manpower supply.

Although the birthrate drop and fewer immigrants would be enough to cause a serious shortage, additional factors are operating to heighten the seriously inadequate supply situation. Particularly since the war, there has been greatly increased industrial activity. There has been much enhanced defense research. A certain loss is due to selective service whatever the deferment practices. Finally, there has been a great increase in the non-productive portions of our population, babies, and old people, all requiring services and materials.

The shortage is quite unique in that it applies mainly to the United States. It is new in American experience and with luck and good management will not reoccur. Britain and Europe did not feel the depression as violently as America, but they did suffer large birthrate drops during and after the war.

I find it strange in popular discussions about the shortage of scientific personnel these controlling factors are largely ignored. Instead we are subject to misleading propaganda. We have been told that our very national existence is threatened since Russia is graduating more scientists that we are. A news release dated October 1, 1956 said "Last year Russia graduated 50,000 engineers to the US's 22,236. The main reason for the shortage is lack of interest on the part of the individual students . . . he is not told of the limitless opportunities in the technical and scientific fields." This is so much poppycock.

I find it somewhat disturbing to be told our standards should in any way be compared with those of Russia. Her problems are her own. She has only recently entered the industrial arena and did not suffer from a depression. I would emphasize that at this country's level of development, concern should be with quality and not quantity. There has always been a shortage of the best brains.

Typical of some estimates made is one that in 1965 the chemical industry will be short 93,000 scientists and engineers, with a total national shortage of 457,000. The figures are arrived at by extrapolation — assuming a rate of supply and estimating the future expansion of the industry. This is very shaky guess work on which to base something as important as the welfare of young college graduates. I believe the expansion of the chemical industry is approaching asymptotically a much lowered rate of expansion, geared more nearly to the natural increase in population. Moreover — future expansion will depend more and more on methods where highly trained and capable people will produce much more per man. Everywhere we speculate on the future, we find the emphasis is on quality.

What does society say concerning the "shortage of scientists" in industry, remembering that industry is the servant of society. An editorial in *Science* for December 1955 says "When industrial production and military strength depend as they do on science and engineering it would be easy indeed to be stampeded into adopting measures designed to strengthen science at the expense of other areas of human endeavor". As Earl McGrath, former Commissioner of Education put it, "If we continue to syphon off the best brains into the sciences . . . our country will suffer in the long run."

Who is brave enough to say that, perhaps, the needs of this democratic society are for poets, artists, theologians, and philosophers rather than for scientists? These fields of culture cannot offer large financial inducements, but they add immensely to human happiness. I cannot but feel that to deflect an artistic temperament into science against its inclination cannot but end in failure. I can even view with horror the appearance of an Elvis Presley or a Liberace in a laboratory . . .

In the decade following the depression, the birthrate again rose and by 1955 was running at an all time high or 25 per thousand. The upturn in elementary school enrollment was felt in 1947, in high school

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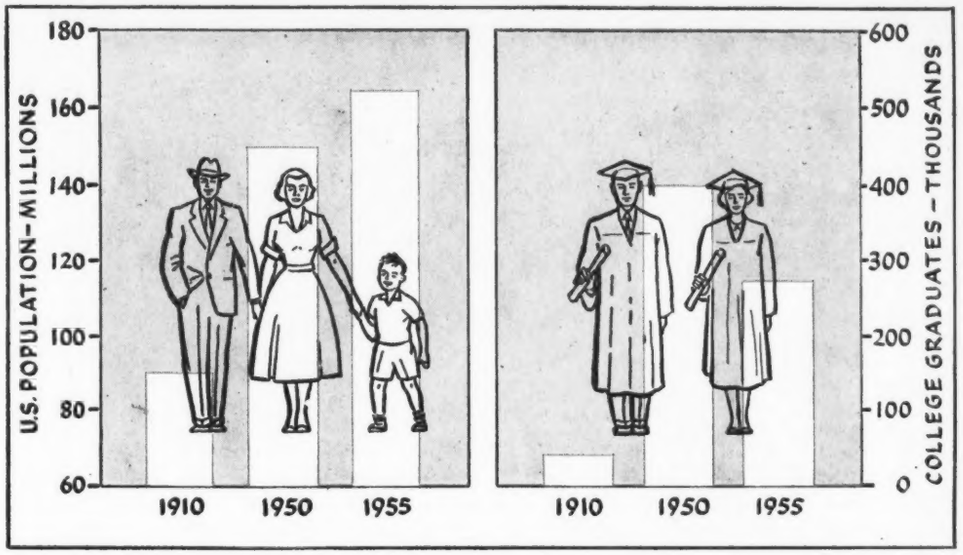
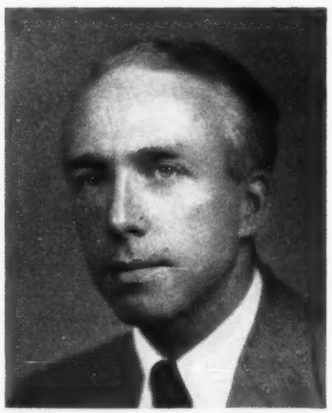
population and college graduates - 1910 to 1955





Dr. Christopher L. Wilson is executive of two chemical companies and consultant to many others. He is responsible for many developments in polyester-polyurethane foams and holds many patents, including several for polyvinylformal sponge. Dr. Wilson has been professor at Ohio State University and is currently research professor at University of Notre Dame.

Dr. Wilson engaged recently in a manpower symposium in Philadelphia, Pa., under sponsorship of the American Chemical Society and three other technical societies. Much of this article is based on his comments at the symposium.

The inside story of how a manufacturer obtained technical assistance from a supplier, and how — by work together — both companies benefited, is revealed by Kenneth F. Quinn, Chief Chemist, The Moreland Corp., in the story behind —

TECHNICAL SERVICE REPORT 56 — 178

DEVELOPMENT OF INDUSTRIAL ROLLS FROM "HYPALON"

Let's start back about two years ago.

Moreland Corporation is the largest roller manufacturer devoting all its efforts to the production of rubber-surfaced squeeze rollers for the textile, leather, metal, and paper industries. (Our company also makes a complete line of rollers for the printing industry.)

Manufacturers in these industries --like all others who are faced with increased labor and overhead costs -- tried to raise production rates in order to hold unit costs in line. This required upping many process variables, such as pushing squeeze-roll temperatures past the 225°F limit to 350° and even 500°F.

However, at higher temperatures, rolls that were surfaced with conventional elastomers failed very quickly. Our customers came to us for help. They also gave us other requirements: the rolls must be chemical- and abrasion-resistant, stand up under pressure -- and be reasonably priced.

No such rubber roller had yet been made that met all these requirements -- especially that one on price.

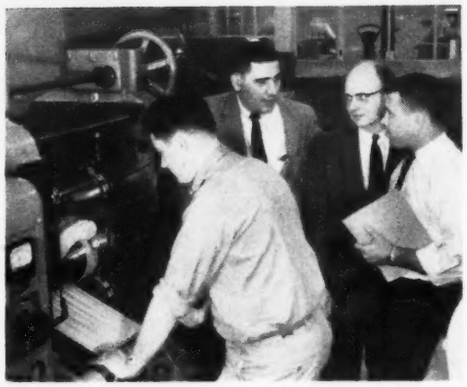
Early last year, Moreland heard about a new elastomer that looked as though it might be the answer. This material was called

Turn to next page

At the Elastomers Lab, experimental calendered Hypalon sheet is checked by Ken Quinn of Moreland Corporation before building into a test roll on lab-scale lathe shown at far right. On left, is Ralph Graff, DuPont technical representative who coordinated this program. Next is Quinn, then Jack Knox, lab rubber chemist. Technician, right, freshens sheet for good adhesion during roll building

As final check before finished Hypalon-covered roll leaves Moreland's plant, Ken Quinn personally inspects it after grinding, with a crown dial gage

At the Moreland plant, Quinn and foreman Warren Taylor (men in background) scale-up production to their 48", three-roll calender. Hypalon sheet is wound on liner in foreground



Adhesion of the Hypalon plies to the metal core was a problem. Various ideas were tried in the lab, using this test on a sample core. It was found that a natural rubber/Hypalon or a neoprene tie-gum between the metal core and Hypalon solved this problem

As shown on this month's cover, Moreland's Quinn (left background) discusses a processing idea with Chemist Paul Bertsch at DuPont's Elastomers Lab. Technical representative Graff (with glasses) listens

COMPOUNDING RECOMMENDATIONS

Our development work in compounding stemmed from two basic recipes by Du Pont.

	Magnesia Cure	Litharge Cure
Hypalon 20	100	100
Staybelite Resin	2.5	2.5
Magnesia	20	—
Litharge	—	40
Fillers	Carbon black or inorganic fillers as desired.	
Softeners	Process oils or plasticizers as desired.	
MBTS	—	0.5
Tetrone A	1.0	0.75

These were modified with special ingredients to obtain the maximum results with respect to the properties in which "Hypalon" excels as a roll covering: heat resistance, chemical resistance, and abrasion resistance.

Hypalon

Starts on page 17

Hypalon, a chlorosulfonated polyethylene made by the DuPont Company.

Technical Service Steps In

DuPont's technical service representative told us that Hypalon looked like it would be a "natural" to meet these requirements, and although it had never been proven commercially in this application, his company would like to help us.

In March 1956, the DuPont chemists came up with some suggested formulations, but none worked right when put in production. The calendered stock rippled and caused air entrapment during roll building, and the adhesion of the stock to the steel core was poor.

In mid-April, the technical representative arranged a visit to the DuPont Elastomers Laboratory in Wilmington, Del. Here, compounding techniques were evaluated.

A full day was spent in the labs at the calender and building lathe. The technical service engineer, the lab chemists, and we at Moreland worked together. We pooled our processing know-how with the chemists' detailed knowledge of Hypalon.

Variations in temperature were found to be causing the processing difficulties. It was also discovered that using a tie-gum before plying-up the Hypalon top stock solved adhesion problem for rolls used at high pressures. (A tie-gum is a thin layer of rubber gum that is wound on the sand-blasted steel core before the top stock.)

Back at Willow Grove next day, our technique was modified according to what we found best in the lab trials. At last we were successful.

A large roll was built and sent to a floor-tile manufacturer who is using it to force uncut tile sheeting against a chrome-plated roller to give the finished tile a high gloss. Operating temperatures are in the 350° range. Release properties are good.

The Hypalon roll ran seven weeks, then was taken out and rebuffed. It ran another eight weeks after it was reinstalled. Even the neoprene rolls formerly used ran only two weeks before they broke down and had to be rebuffed about ¼" to give a fresh surface and original roundness. By repeating this, they babied each roll to last about eight weeks. This meant rebuffing, a fortnightly shutdown, and replacement every eight weeks.

To be sure, Hypalon is not a cure-all for everything. It's still a specialty rubber and does its best in special applications. Right now, however, Hypalon rolls are making great inroads in uses where rolls covered with other elastomers failed. In fact, Moreland has sold a large number of Hypalon-covered rolls to date.

Before this experience, we thought that technical service was strictly a help to a customer such as us. But now we've found that the customer can give a lot of ideas to the supplier. For example, DuPont has requested permission to tell other interested roller manufacturers about the tie-gum technique we developed. Of course this was granted. The formulations developed are also a direct outcome of close cooperation and free interchange of ideas between the two companies.

DuPont benefits by using this information to help other industrial roll manufacturers to add Hypalon-covered rolls to their line. This is fine with us — we benefit by being established as the *first* manufacturer making these Hypalon industrial rolls commercially.

Manpower Shortage

Starts on page 13

enrollment in 1954. Colleges will feel the impact forcefully by 1960. By the middle 60's the supply of qualified graduates will be probably double what it was in 1952, particularly since we have seen over that the past 30 years the proportion of young people graduating from college has risen. Between 1960 and 1970 we can expect a surplus of scientists. This will be particularly true if a reduction in defense spending occurs.

The problem of scientific manpower is thus susceptible to no easy solution. Especially is it erroneous to try and herd young high school graduates into science since any such effect would not be felt for many years, and at that time there is likely to be a surplus. Although industry wants a surplus, society wants a balanced economy in all respects. The only intelligent immediate solution is to make better use of what we have. We must make better use of women and minority groups, continually increasing the thoroughness of our search for talent and increasing its training.

The *New York Times* for November 25, 1956, reported employment of women was rising rapidly. But during the past five years I have failed to place two brilliant women Ph.D's in the chemical industry. They both wished to make better use of the careers for which they had spent so long preparing. Instead, they were married and in this way are perhaps better serving the needs of society.

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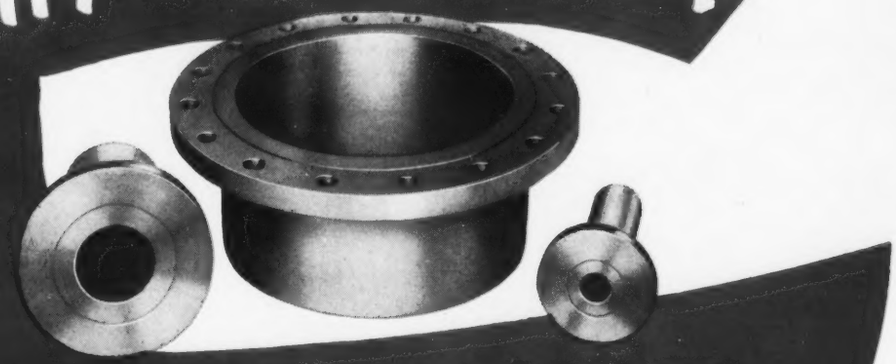

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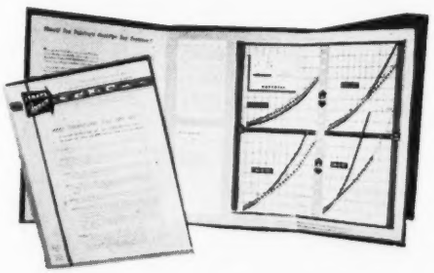

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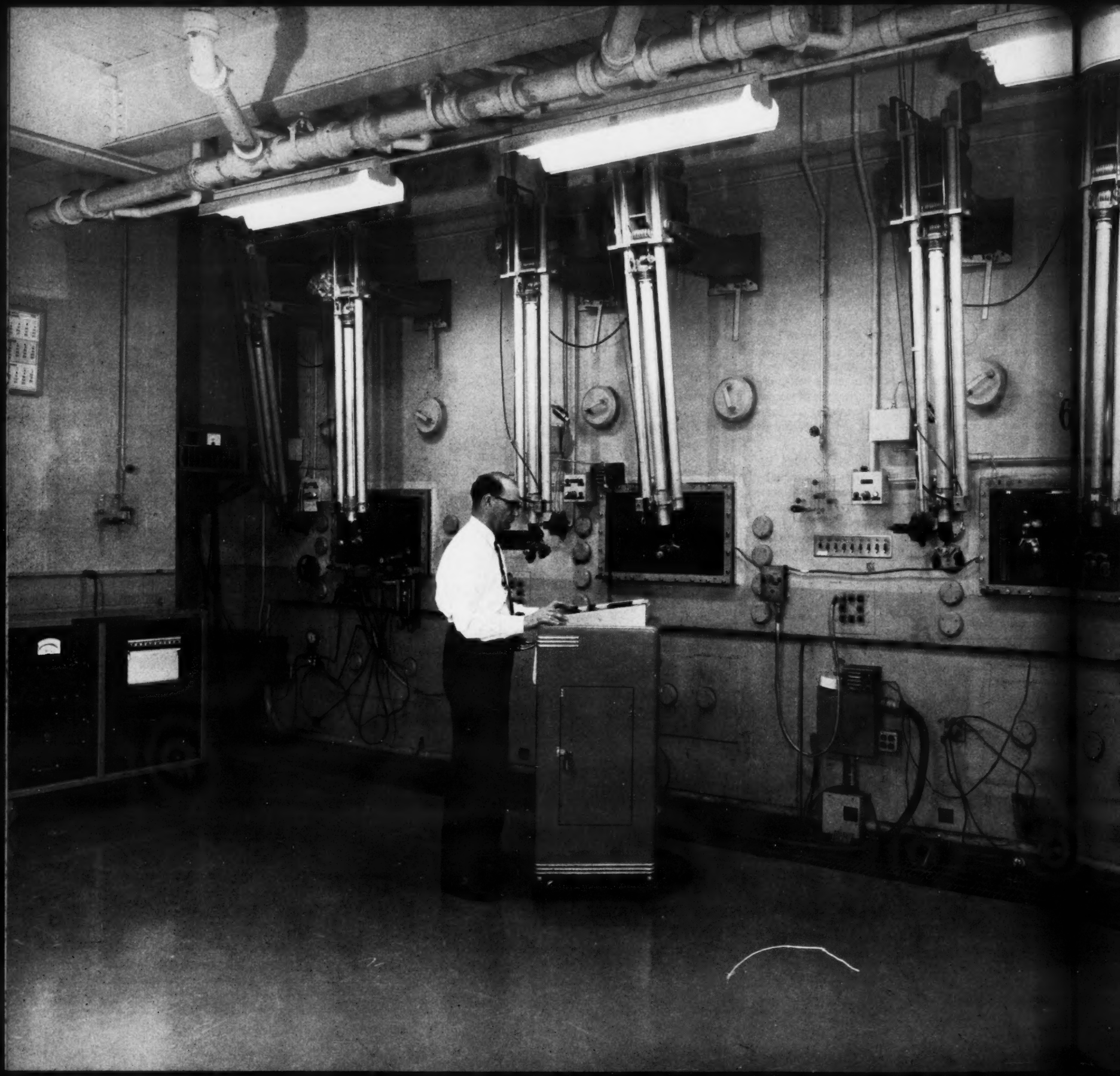
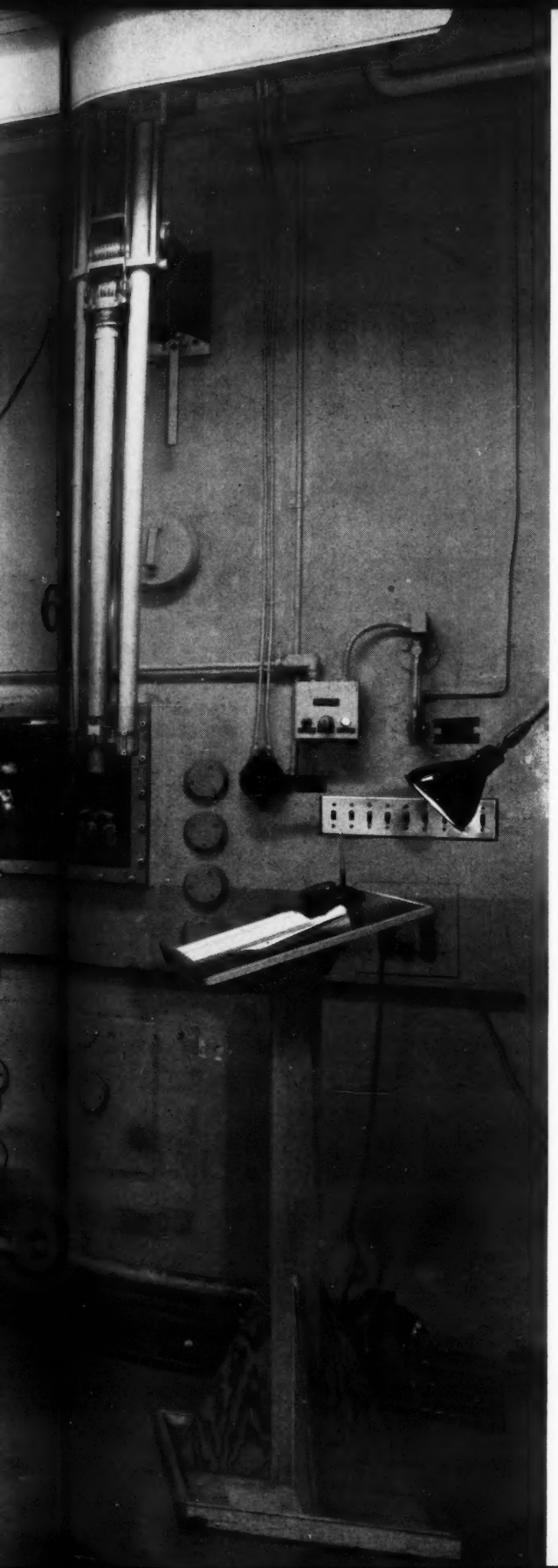




At the Westinghouse Atomic Laboratory near Pittsburgh, 36"-thick windows made from special glasses which can attenuate 300,000 roentgens of radioactivity per hour provide —

safe shielding with high visibility while handling "hot" materials

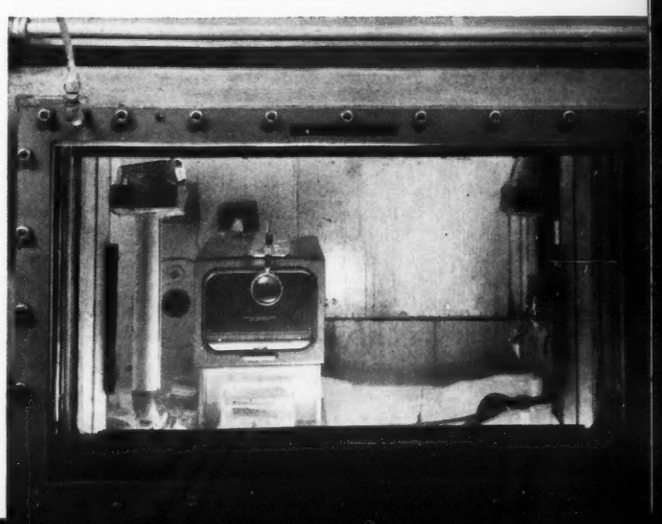
RAY C. WESTPHAL, Supervising Engineer
CTA Hot Laboratory, Bettis Atomic Division
Westinghouse Electric Corporation
Westinghouse, Pennsylvania
With **CP Staff**

Problem: Low-level cells at the Westinghouse Bettis Atomic Laboratory could only handle material with a maximum radioactivity of 10,000 curies. Windows for viewing cells were composed mostly of one-inch panes of non-browning lead glass to 34" depths. Two of the windows were so-called water windows — two panes of glass separated by 36" of water — with even lower shield ratings and with further disadvantage of optical distortion.

At the Westinghouse Atomic Laboratory, fuel elements and structural materials connected with the building and maintenance of a nuclear reactor are studied. These materials have all been subjected to bombardment in a nuclear reactor. Researchers evaluate such properties as hardness, density, tensile strength, and other mechanical and physical traits of a radioactive material. Typical materials studied are zirconium, beryllium, aluminum, stainless steels, cadmium, boron, uranium, and thorium.

In order to study these materials to best advantage, Westinghouse decided to build an addition to its Atomic Laboratory where materials of higher radioactivity could be examined. Windows were

Turn to page 235

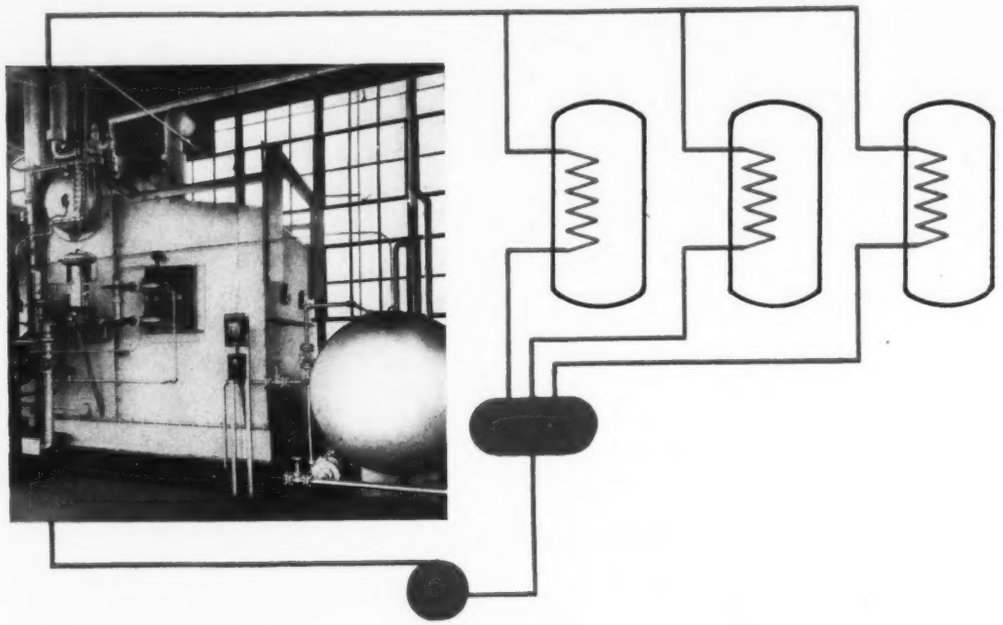


Looking through three feet of radiation-shielding glass at enough radioactivity to kill a man after three seconds exposure. Instrument resembling television set is actually an extremely accurate weighing device for radioactive materials. Magnifying glass helps observer to read weights indicated on small vernier scale

High-level "hot" cells at Bettis Atomic Plant of Westinghouse. Three windows are made of radiation-shielding glass. Engineer is working controls of electrically operated hands

HEAT ENGINEERING by FOSTER WHEELER

fits the vaporizer to your process



ONLY FW considers your entire process system, then recommends the proper high-temperature, low-pressure vaporizer.

IN THE design of high-temperature, low-pressure heating systems a few constructive suggestions by FW engineers often help prevent future processing problems. That's why Foster Wheeler doesn't stop at the vapor outlet, but analyzes your *entire process heating system.* This assures a vaporizer that's *right* for the job. What's more, it gives you the benefit of Foster Wheeler's 23 years of experience in the design and application of heating systems using Dowtherm — to make sure that your piping arrangements, circulation system and thermal design are correct in every detail.

Remember, too, that only FW does the *complete job* — designs and builds the vaporizer, installs it in your plant, puts it "on stream" and makes sure that everything functions at top efficiency. FW engineers are available, too, to solve any future problems that may arise in connection with plant expansion, process changes or relocation of heating equipment. For further information, send for Bulletin ID-54-5. *Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.*

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June 2-5. The American Society of Refrigerating Engineers, annual meeting, Hotel Fontainebleau, Miami Beach.

June 3-5. American Management Association, General Management Conference, Hotel Statler, New York.

June 6-8. Manufacturing Chemists' Association, annual meeting, The Greenbrier Hotel, White Sulphur Springs, West Virginia.

June 9-12. American Institute of Chemical Engineers, national meeting, Olympic Hotel, Seattle, Wash.

June 9-14. The American Society of Mechanical Engineers, semi-annual meeting, Sheraton Palace Hotel, San Francisco.

June 11. Synthetic Organic Chemical Manufacturers Association, luncheon meeting, Hotel Roosevelt, New York.

June 11-13. Third Western Plant Maintenance and Engineering Show and Conference, Civic Auditorium, San Francisco.

June 12-14. Illinois Institute of Technology, Operations Research Conference, IIT Campus, Chicago.

June 13-14. The Society of the Plastics Industry, Inc., Midwest Plastics Conference, "How to Exist in Today's Market," Arlington Hotel, Hot Springs National Park, Arkansas.

June 14. Society of Plastics Engineers, Inc., Regional Technical Conference, "Plastics for Electronics," Lowell Institute of Technology, Lowell, Mass.

June 16-21. American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J.

August 20-23. Western Electronic Show and Convention, Cow Palace, San Francisco.

September 8-13. American Chemical Society, national meeting, New York.

September 9-13. The Instrument Society of America, 12th Annual Instrument Automation Conference and Exhibit, Auditorium, Cleveland.

September 10. Synthetic Organic Chemical Manufacturers Association, luncheon meeting, Hotel Roosevelt, New York.

September 15-18. American Institute of Chemical Engineers, meeting, Lord Baltimore Hotel, Baltimore.

October 6-10. The Electrochemical Society, Inc., meeting, Statler Hotel, Buffalo, New York.

October 28-31. The National Industrial Packaging & Handling Exposition, Convention Hall, Atlantic City.

November 12-14. National Association of Corrosion Engineers, Northeast Region, fall meeting, Penn-Sheraton Hotel, Pittsburgh.

November 18-21. Air-Conditioning and Refrigeration Institute, Tenth Exposition, International Amphitheater, Chicago.

Vol. V No. 3 JUNE 1957

chemical business

Trends in the chemical world . . . what they mean to you as reported by the editors of CHEMICAL PROCESSING

$50 Million for Farm Product Research page 27
Standard Oil Reverses Additive Position page 28
Polyethylene Battle Shapes Up page 30

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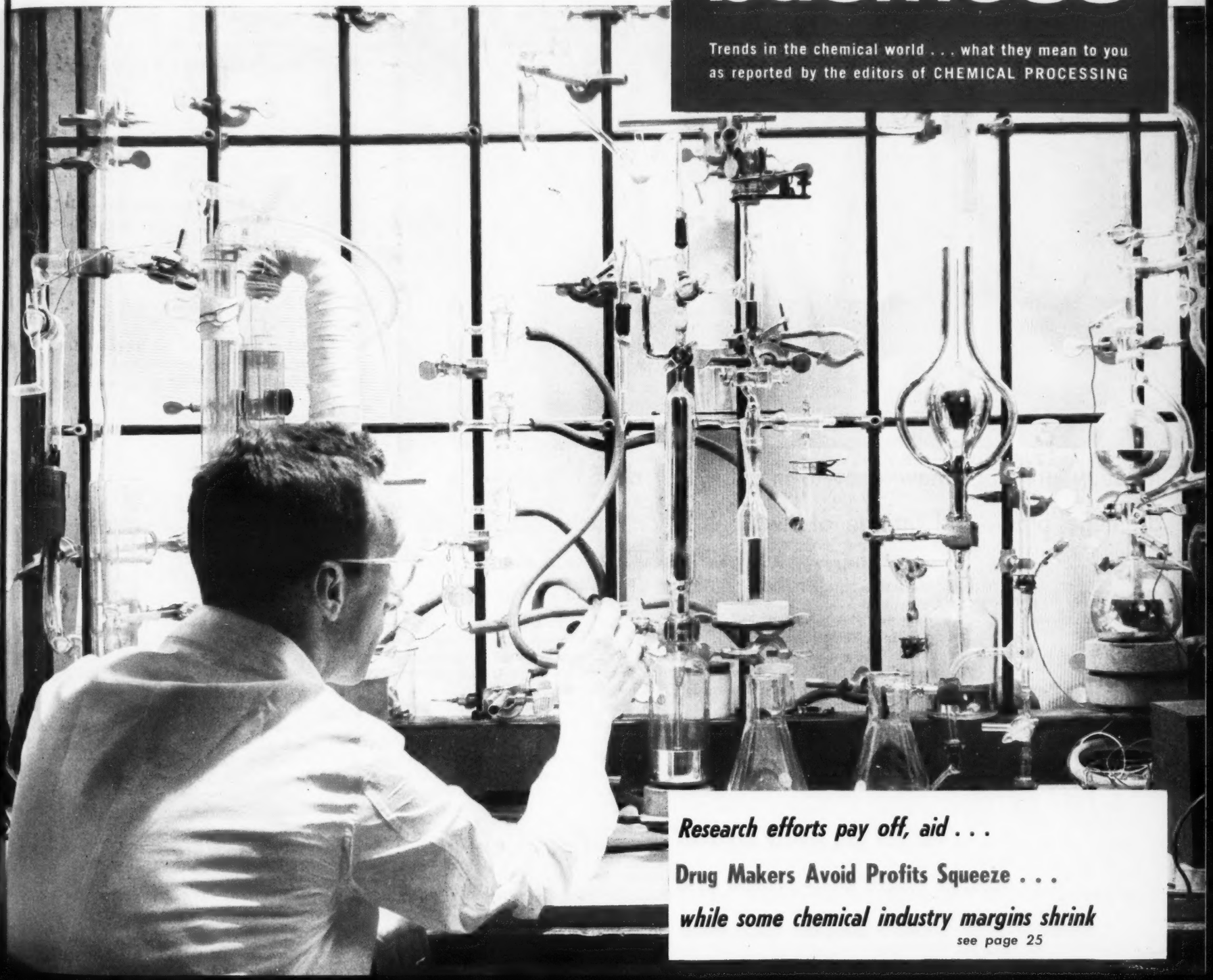

Research efforts pay off, aid . . .

Drug Makers Avoid Profits Squeeze . . .

while some chemical industry margins shrink

see page 25

PLANT ENGINEERS CUT LABOR TIME 75%
WITH NEW CORROSION-FREE DRAINAGE SYSTEM

Industry develops new easy-to-install low cost
drainage pipes and fittings of PVC based on EXON 402-A

...another use typical of the Pin-Pointed Properties in Exon Vinyl resins

Tube Turn Plastics, Inc., timed a journeyman plumber as he made a bell and spigot joint in a 2" Schedule 40 alloy cast iron line. *It took 3 minutes, 45 seconds.*

Then he joined a length of new 2" Schedule 40 PVC pipe to a newly developed PVC socket type solvent welding drainage fitting. *Complete time: 56 seconds . . . a labor saving of 75%.*

This is one reason it is more economical to dispose of corrosive industrial liquid wastes with drainage systems of PVC based on Exon 402-A resin. Installation requires less labor per joint . . . fewer tools and materials . . . and fewer joints.

The new socket type drainage fitting eliminates troublesome corrosion pockets and gives you unimpeded flow conditions. It is unaffected by ground conditions, acid or alkaline, wet or dry. It is not subject to galvanic or electrolytic action.

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chemical business
JUNE 1957
Vol. V No. 6

Highlights

Drug houses hold their own against rising costs, maintain profit margins generally higher than rest of the chemical industry page 25

MCA battles Kefauver-Patman bill, claims amendment to Robinson-Patman Act would kill competition in chemical industry page 25

$50 million asked of Congress for research on industrial use of farm products. Presidential Committee claims chemical industry is usurping farm product markets, suggests action page 27

Competition in low-pressure poly grows as some plants go on-stream, others are readied. Nomenclature just one of marketing problems foreseen page 30

Super premium fuel from Standard of Indiana. Gold Crown gasoline to use phosphorus additive, reversing Standard's previous stand on phosphorus compounds page 28

■

This month's CB cover . . .

shows part of Abbott Labs' nuclear medicines research program.

Growth Of CMRA Parallels That Of Market Research In The Chemical Industry

Informal market research has been carried out for as long as business has existed but it has only been about sixteen years since the first progressive companies established organized departments to handle their market research on a scientific basis. And, equaling the field in age, the Chemical Market Research Association has had growth which parallels the chemical industry's interest in market research.

Formed in 1940 as a medium of exchange for information about the infant field, CMRA started with thirteen members, now has over 500 who represent about 185 companies in the US, Canada, France, Austria, and Brazil.

Activities of CMRA meetings consist generally of studies of basic research techniques, studies of major industries, and economic trends. Each year, three or four open meetings are attended by 500 to 1000 people, and the meetings are conducted to encourage informal discussion.

Although market research is essentially a business function, most CMRA members have formal technical training. Many have had additional business training or have worked in a variety of departments in chemical industry in order to develop a broad background of experience. The market researcher must have enough technical knowledge to ask the proper questions, to appraise the value of the data obtained and to assemble a suitable report for management. Also, since market research is one of the few positions in modern companies that provide an over-all, as contrasted with a specialized, experience, a large percentage of market researchers graduate to management positions. The organization contains many such members whose functions are now general management but who have retained their recognition of the importance of market research.

Turn to page 32

Another Profits Spree For Pharmaceuticals; Lilly, Abbott, Pfizer Gains Above Industry Average

First quarter sales and earnings reports from major pharmaceutical houses indicate that 1957 will be another banner year. Prospects seem to be even better than last year, and 1956 saw drug makers outpace the general economy.

The percent increases over the first quarter of 1956 are in some cases almost surprising—in others, not so spectacular but still pretty much in line with the chemical industry as a whole.

Pfizer reported sales up 16 percent while earnings were up 19 percent. Abbott increased sales 10 percent, earnings to something like 18 percent. Lilly has turned in a rather remarkable 27 percent increase in sales and boosted its earnings to a strapping 38 percent.

Merck sales for the quarter increased 3.2 percent, with earnings going up about 4 percent. G. D. Searle increased its sales eight percent and earnings only two percent.

The most surprising gain by-far is that shown by Lilly. Pre-polio season sales of Salk vaccine are probably responsible for the bulk of the increase but Lilly spokesmen maintained that other factors were equally responsible. Still, Lilly's management has noted that "it would be unrealistic to multiply the first quarter figures by four and expect to come up with anything like the 1957 total." Other factors that Lilly points to as contributing to the high earnings increase: Facilities are operating at almost top capacity, keeping costs to a minimum.

Merck's not-so-impressive showing isn't a result of a slow first quarter this year so much as a very good first quarter last year. Two new and successful drugs were introduced during the period in 1956, although the fact that bulk vitamin prices are down somewhat this year has some bearing on the picture.

It's interesting to note that in only one case did the percentage of earnings increase fall below the sales increase. This trend, still evident in the drug business, is at odds with the general situation developing through the rest of the chemical industry, where a significant number of companies are experiencing tighter profit margins in most cases (see April CB).

Turn to next page

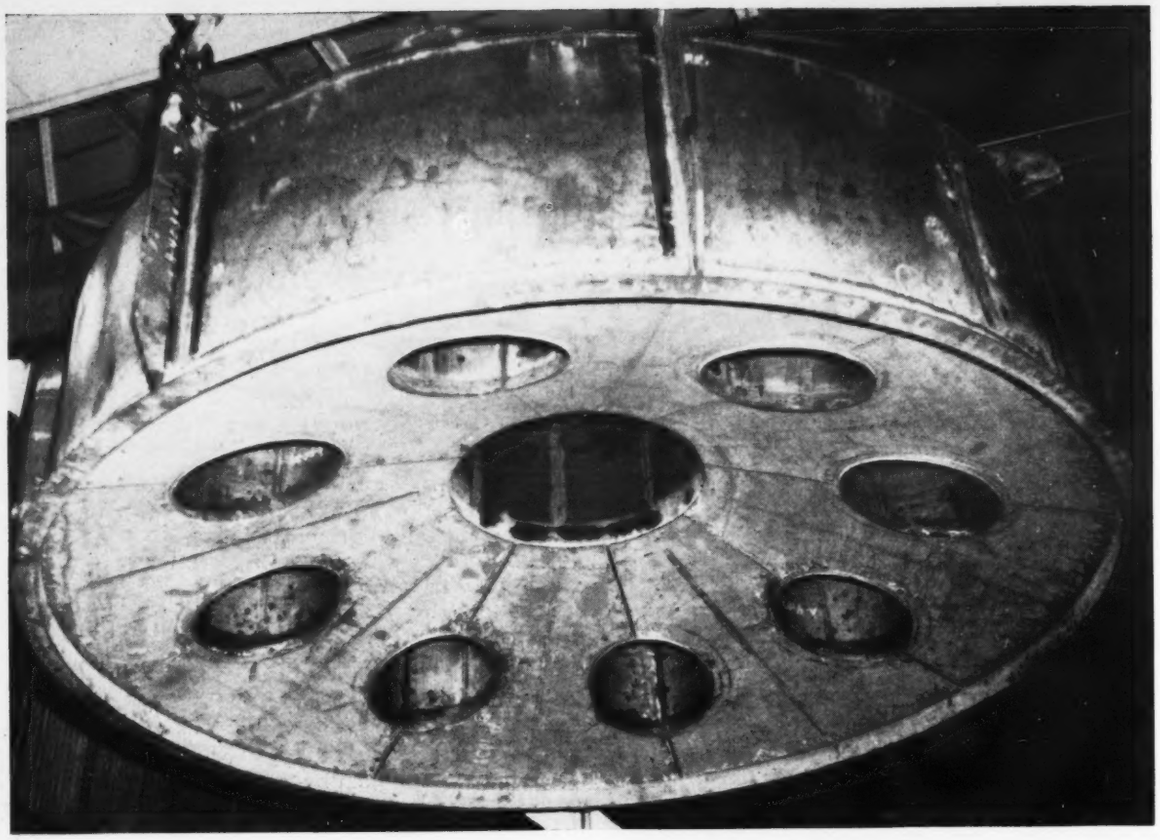
Kefauver-Patman Amendment To Stifle Competition, Says MCA

Restating the position it took when appearing before the Senate Subcommittee on the proposed Kefauver-Patman amendment to the "good faith" pricing legislation, the Manufacturing Chemists' Association has called for individuals within the chemical industry to take a stand against the proposed law.

"If the Kefauver-Patman idea were allowed to develop fully," says MCA Counsel Claude Hobbs," American producers would inevitably drop product lines favored by foreign chemical makers, and the US could easily find itself where it was 40 years ago, dependent on foreign sources for many critical chemical materials.

"Under present law," explains Hobbs, "a seller charged with 'selling at discriminatory prices' can defend his action by showing that he was simply meeting the lower price of his competition . . . in 'good faith.' If the Kefauver-Patman bill becomes law, this defense would be removed.

On page 10 of this month's Chemical Processing, Counsel Hobbs states the MCA's position, explains how the proposed legislation can affect the chemical industry as a whole as well as individual companies, suggests ways for industry to oppose the bill.



Hat size 240

Talk about ten gallon hats, here's a lid for a vaporizer that measures twenty feet in diameter. There were special problems of tailoring. There had to be stainless steel where the vapors flow to resist corrosion, and a carbon jacket to contain steam for heating.

The dome on top of this vaporizer acts as an inverted funnel. The holes you see in the dome are the outlets for the corrosive vapors. With an injection of steam, in the jacketed area of the dome, these vapors are re-heated to keep them in a gaseous state 'til they reach the next step in process.

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Drugs

Starts on preceding page

A major reason for the difference is the nature of the drug business itself. High research-to-sales expenditures continue to create a rapid progression of new products which can become multi-million dollar sellers almost overnight. The cortisones were this sort of "strike" . . . probably the tranquillizers have been the most spectacular in recent years, at least among products produced by more than one company.

Rapid sales growths in the drug business aren't rare, however. Smith, Kline & French experienced a 40 percent increase in net sales for 1955 over 1954. The 1956 increase then dropped back to a modest 14 percent.

The Schering Corporation had net sales of $19.4 million in 1954. Then in 1955, with the introduction of a new prednisone, sales jumped to an impressive $46 million . . . an increase of 137 percent. The 1956 figures again rose to $56.9 million, an increase of 24 percent.

Most of the drug companies are also looking for large incomes from the non-medical fields. Agricultural products will be contributing a big chunk of these earnings. Merck has recently expanded in the field with the introduction of Gibrel for the improvement of plant growth. Abbott has also announced that their gibberellic acids are available to formulators. Pfizer is happy over prospects for their Terramycin Egg Formula for egg production improvement.

Pfizer is also investigating a series of products for other markets. Noteworthy are several compounds which show promise as food emulsifiers.

CCDA Names Officers For 1957-58

E. L. Johnson, International Nickel Company, has been named President-elect of the Commercial Chemical Development Association for the year 1957-58. New v-p, elected at the group's annual meeting, is **W. J. Riley** of Food Machinery.

Amoco's **G. A. Harrington** is new Executive Secretary, and **W. M. Barnes** of Southwest Research Institute and **W. A. Woodcock** of Union Carbide Chemicals are Directors.

Congress Asked For $50 Million For Industrial Uses Research On Agricultural Products

"The industries creating synthetic products from non-farm sources are constantly staking out for themselves new areas of consumer demand which only agressive and alert research can preempt for agriculture," say J. Leroy Welsh, Chairman of the President's Commission on Increased Industrial Use of Agricultural Products.

"In other words, our chemical industries have been doing such a good job in developing synthetics (such as fibers, detergents, paints, and adhesives, which were once all made from agricultural products) that agriculture feels they are now losing by default."

What's going to be done about it? Plenty, if the recommendations of the bi-partisan Commission are followed. This group is urging Congress to authorize between $50 and $150 million annually for research on finding more industrial uses for farm products.

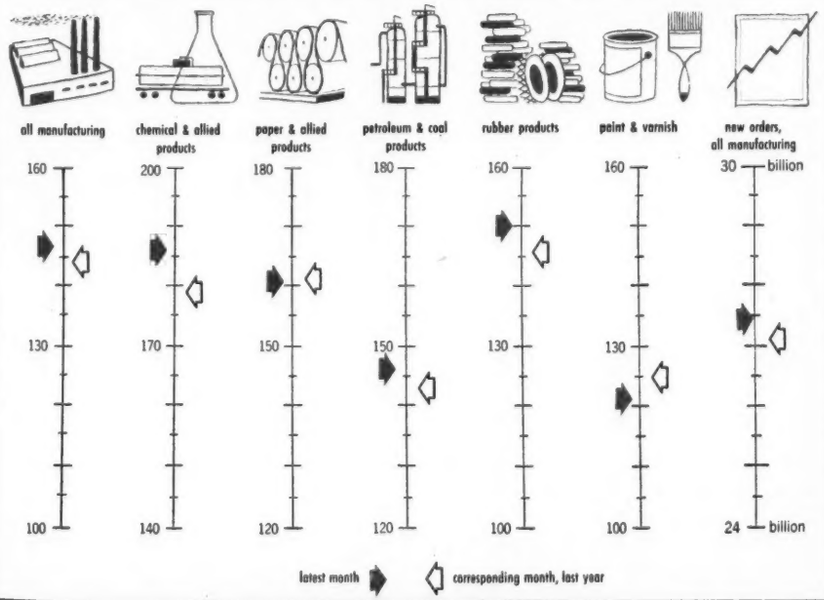
This is a big increase over the present $16.1 million expenditure, and is to be in addition to the more than $300 million for new crops research, development, and incentives.

The Commission admits their request is conservative. The concensus of the 425 experts and executives who helped on this project was that $211 million annually is needed to do a complete job.

They cited that the chemical and petrochemical industries are spending 4 to 7% of annual gross sales on research — most of which is going to find synthetic products from non-farm sources. Even manufacturing industries spend 3% on research. Meanwhile, agriculture is limping along on less than ½ of 1%, based on value of major domestic farm products used by industry. (This amounted to $3.5 billion of products in 1954-1955, and represents production of about 7% of total US cultivated acreage.)

chemical business INDEX

Production indices, from latest available Federal Reserve Board figures, based on 1947-49=100. New Orders, All Manufacturing, (last column) from latest available Department of Commerce data.



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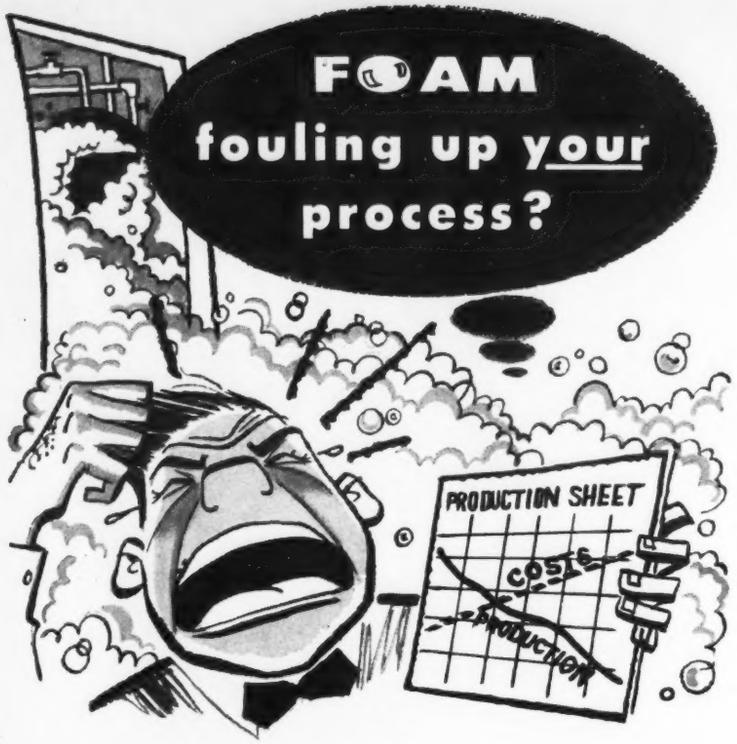

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TITLE

COMPANY

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Aqueous system

Food products

Other

When inquiring check 3814 opposite last page

chemical business

Our Growing Industry

Borden Company Puts Formaldehyde And Resins Plant On Stream

Geared to produce an annual 36 million pounds of material, Borden's new formaldehyde operation has gone on stream at Fayetteville, N. C. Production at the new facility will boost Borden's share of the total US formaldehyde production to something like 12 percent. This makes 32 chemical plants Borden is operating in the US and abroad, including five formaldehyde producers.

The new plant is fully automated and employs about 25 workers. From the output, the company will make urea resins at the site. The plant will also serve as a warehouse for Borden's PVA and PVAc.

Allied's General Chemical Division

. . . has contracted for a sulfur recovery plant to be constructed at Linden, N. J. The plant will use hydrogen sulfide from Esso's Linden refinery for feed stock, will produce a daily 60 tons of elemental sulfur.

Plant will be designed for maximum recovery, minimizing loss of material to the atmosphere. Mass spectrometer will analyze plant tail gases. Any residual compounds will be incinerated prior to discharge. Operation is expected to be completed late in the year.

Grace's Davison Division

. . . will begin commercial scale production of Phillips' polyolefin catalyst later this year. Plant is located adjacent to the company's petroleum catalyst operation at Cincinnati. The company has previously been producing pilot plant quantities of the material.

Rated at 8000 pounds daily, the plant will produce enough catalyst to supply all licensees of the Phillips high-density PE process. Among these is Grace's Polymer Chemicals division, with a plant under construction at Baton Rouge. Others holding the Phillips license are UCC, Celanese, as well as Phillips itself. Kellogg recently relinquished its license when it dropped out of the plastics business.

Marketing, Technological Decisions Behind Indiana Standard's Premium Gas

Throughout fourteen Midwest states — from Indiana to Colorado — over 17,000 Standard Oil of Indiana gasoline retailers are changing the white globes atop their premium White Crown gasoline pumps and putting up new gold and white globes for a higher octane, super-premium Gold Crown introduced in mid-May.

Indiana Standard's management decided to discontinue White Crown rather than add a third grade of gasoline, or merely up White Crown's octane number. Thus they focus attention on the fact that every drop of Gold Crown has been catalytically improved (reformed) and is not merely a higher blend of reformate and straight run gasolines.

Indiana Standard's Board Chairman Dr. R. E. Wilson (left) and President F. O. Prior check first of 18,000 gasoline pump globes for Gold Crown Super Premium, now marketed in Midwest

Behind the announcement lies Standard's $60-million Ultraformer program

— five on-stream and three units building. A 1953 Standard development, Ultraforming uses a platinum catalyst to rearrange low-octane molecules into high octane fuel. As a result, Gold Crown's performance octane is up to 9 "notches" above White Crown. (Retail price is upped a little too.)

Two new additives are also in Gold Crown. One — a phosphorus compound — controls preignition ("ping") and corrects spark plug fouling.

Use of the additive indicates a reversal of Standard's previous thoughts on phosphorus compounds. The company has had a long hassle with another oil company about the advantages and disadvantages of phosphorous-containing inhibitors.

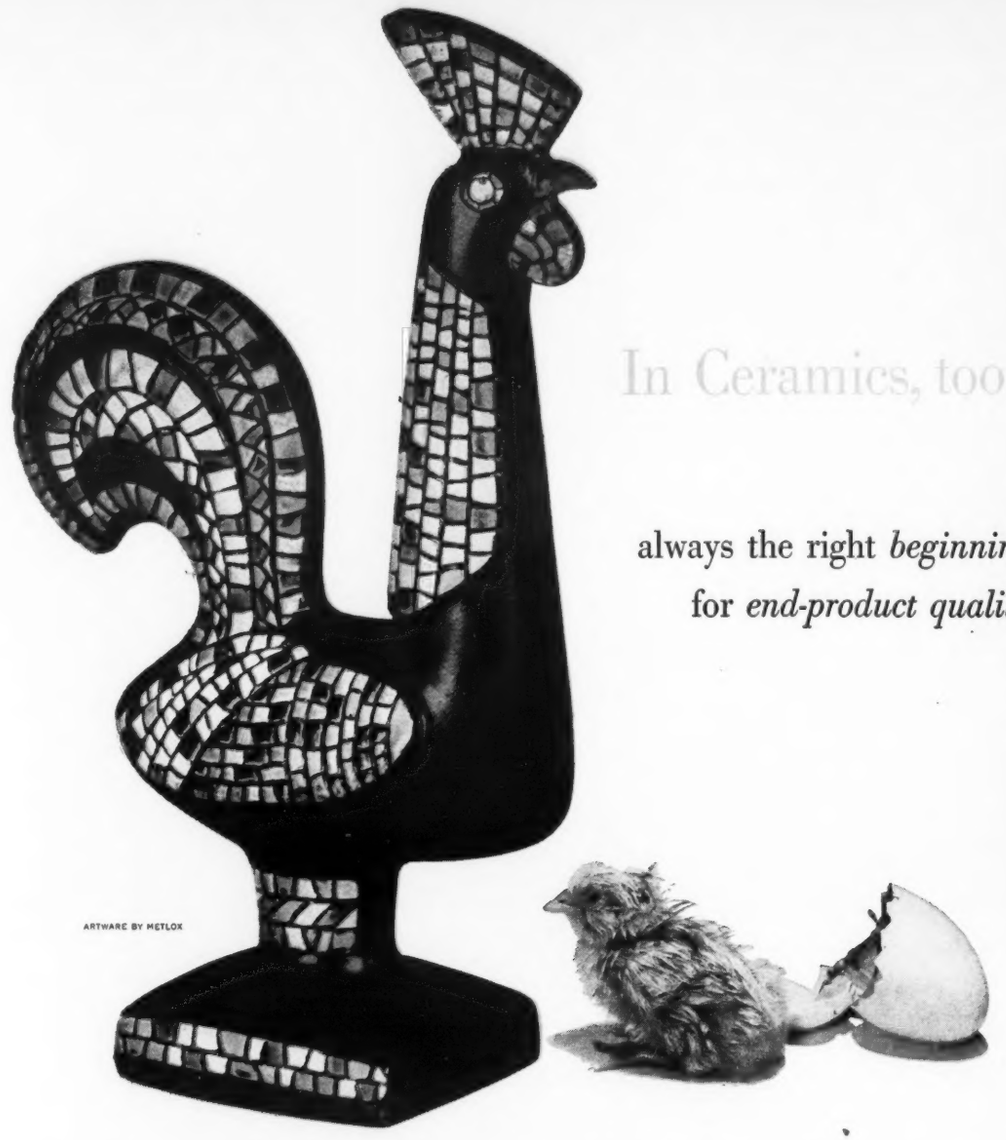
Second additive inhibits corrosion and rust, is long lasting and effective even when engine is turned off. Best guess is that it is a film-forming amine.

Allied Introduces Polyethylene Resins For Pipe Fabrication

Low-pressure polyethylene resins said to be particularly suited to plastic pipe fabrication have been introduced by Allied Chemical. Said to exhibit high bursting strength, resistance to impact, and absence of stress cracking, the pipe is being manufactured and distributed by the Orangeburg Manufacturing Company.

Explained **Forbes Silsby,** Allied v-p: "Properties of the new pipe are ascribed to the high molecular weight and structure of the polyethylene molecule not present in any other known polyethylene. These new qualities of high bursting strength, superior temperature resistance and, particularly, the absence of stress cracking will greatly expand the acceptance of plastic pipe."

Produced at the Semet-Solvay plant at Buffalo, N. Y., the material is made by a process developed by Allied. The process, say Allied spokesmen, is different from any known method and yields a polyethylene resin having physical properties different from and superior to competitive materials.



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In addition to quality glass and ceramic applications, TRONA's boron chemicals are widely used in industrial cleaners, agricultural chemicals, weed-killers and pharmaceuticals. Outstanding among industrial applications for lithium chemicals are all-purpose greases, air conditioning and storage batteries. In the vanguard of these current uses, TRONA's expanding research and development program is constantly creating new markets for boron and lithium chemicals.

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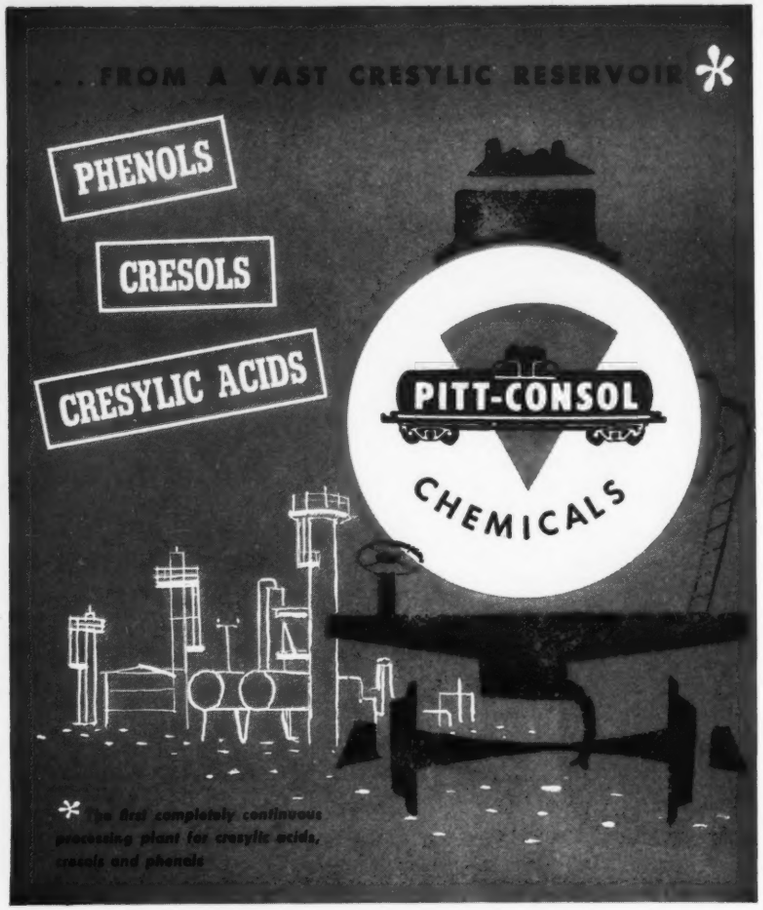

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When inquiring check 3816 opposite last page

chemical business **Marketing Trends**

Battle Lines Shaping Up In Low Pressure Polyethylene; Phillips And Celanese On Stream, Grace And Hercules Ready

Marketing plans of low-pressure polyethylene producers are swinging into high gear. Two producers — Phillips and Celanese — are already on stream and claim to be shipping tonnage quantities. Both Grace and Hercules plan to have plants in operation within a very short time.

Hercules, stealing the march on the other producers, has completely by-passed large scale pilot plant operation. Yet, it will have sold more than a million pounds of commercially produced material by the time its plant gets into operation. This is the result of a two-way information exchange agreement Hercules negotiated with Farbenwerke Hoescht, a German producer and also a Ziegler licensee. The deal included Hoescht making available to Hercules molding powders which the American producer has been marketing for something like 15 months.

Chief advantage to Hercules has been the fact it can make commercially produced material available to molders for experimental use. Molders have experienced trouble with material from pilot plants because of a lack of uniformity. Presumably there has been little variation in the commercially produced powders from Hoescht.

What may prove to be one of the most difficult problems in marketing low pressure poly is finding a name which will distinguish it from conventional poly. Housewives — principal buyers of polyethylene housewares — know that conventional poly can't be boiled or sterilized. Getting the story of the new material across to them may not be an easy task without a generally accepted generic name.

Low-pressure polyethylene is, of course, the most common reference in the trade, with high-density running a close second. Neither of these will mean anything to the housewife. She needs a catch phrase which will immediately distinguish low-pressure poly from the stuff her squeeze bottles are made of.

Plax, not a producer but a loud voice in the industry, has suggested polymethylene — with little luck. This has two strikes against it because it is not

Plans Underway For 1958 European Congress

The European Congress of Chemical Engineering, held in conjunction with the 1958 ACHEMA Congress, will be held in Frankfurt am Main, Germany, and will combine meetings and congresses of five European organizations.

The Congress, taking place from May 31 to June 8, will include these functions: the ACHEMA 12th Chemical Engineering Exhibition and Congress Organized by DECHEMA; Congress of the European Federation of Chemical Engineering; Congress of European Federation of Corrosion; Special Meeting and Lectures of the Gesellschaft Deutscher Chemiker; and the Annual Meeting of DECHEMA Deutsche Gesellschaft fur Chemisches Apparatewesen.

A preliminary program and invitation is available from DECHEMA, Frankfurt am Main 7, Postfach, or check 3817 on the form opposite last page.

Stabilize Clear Vinyls

Till now, stabilizing clear vinyl formulations against the depredations of ultra-violet light has been a constant problem. U-V light causes a breakdown of the plastic, and results in bad discoloration and eventual decomposition.

American Cyanamid found that additions 0.4 to 0.6% of 2-hydroxy-4-methoxybenzophenone gave markedly increased life to clear polyvinyl chloride sheets. You'll find the results of the year-long Florida test on page 53.

chemically accurate and it sounds too much like the familiar polyethylene.

Linear is used a great deal, as is isotactic. But these aren't strictly accurate — and don't mean a thing to the housewife.

Each producer is pushing his own trade name. Hi-Fax, Grex and Marlex all are getting a considerable amout of promotion. But again, these will mean little to the consumer.

Another area of disagreement is the market overlap between the high-and low-pressure polys. Vast market studies have been made, but a clear picture hasn't emerged. One executive — from a high pressure producer with no plans for a low pressure operation — said: "The low pressure materials will have a big play in baby bottles and drug packaging but won't get much more of the bottle market."

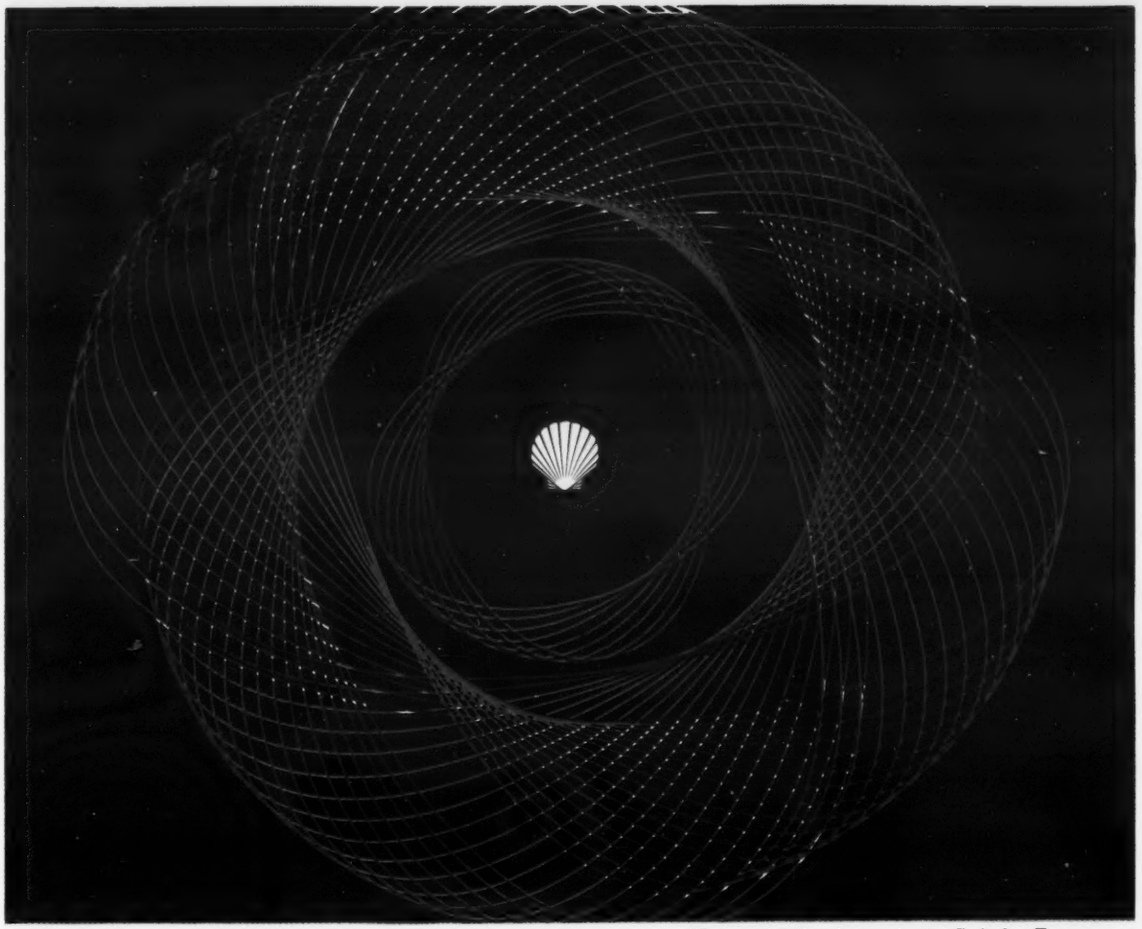
On the other side are the guessers among low pressure producers. They place the low pressure market for blown bottles at between 100 and 150 million annual pounds within five years. They claim less than 100 million pounds of high pressure material will be used for bottles.

One thing is certain: Competition will reach levels rare even in the chemical industry. One prospective producer — Kellogg — has already dropped out of the plastics business. Another, Koppers-Brea, has delayed plant construction for an indefinite time. Several license holders have yet to announce construction plans. The list of polyethylene producers — and potential producers — may differ considerably in a few years from the list that exists now.

Expansion in explosives

. . . is announced by Cyanamid. New facilities of the company's organic chemicals division will increase its annual production of industrial high explosives by about 60 percent. The program will be completed in September.

When completely rebuilt, the New Castle, Pa., plant will be the third largest explosives plant in the US. The company operates another explosives facility at Latrobe, Pa., and maintains 34 magazines in 15 states.



"Integration," an impression by C. Arthur Rosser

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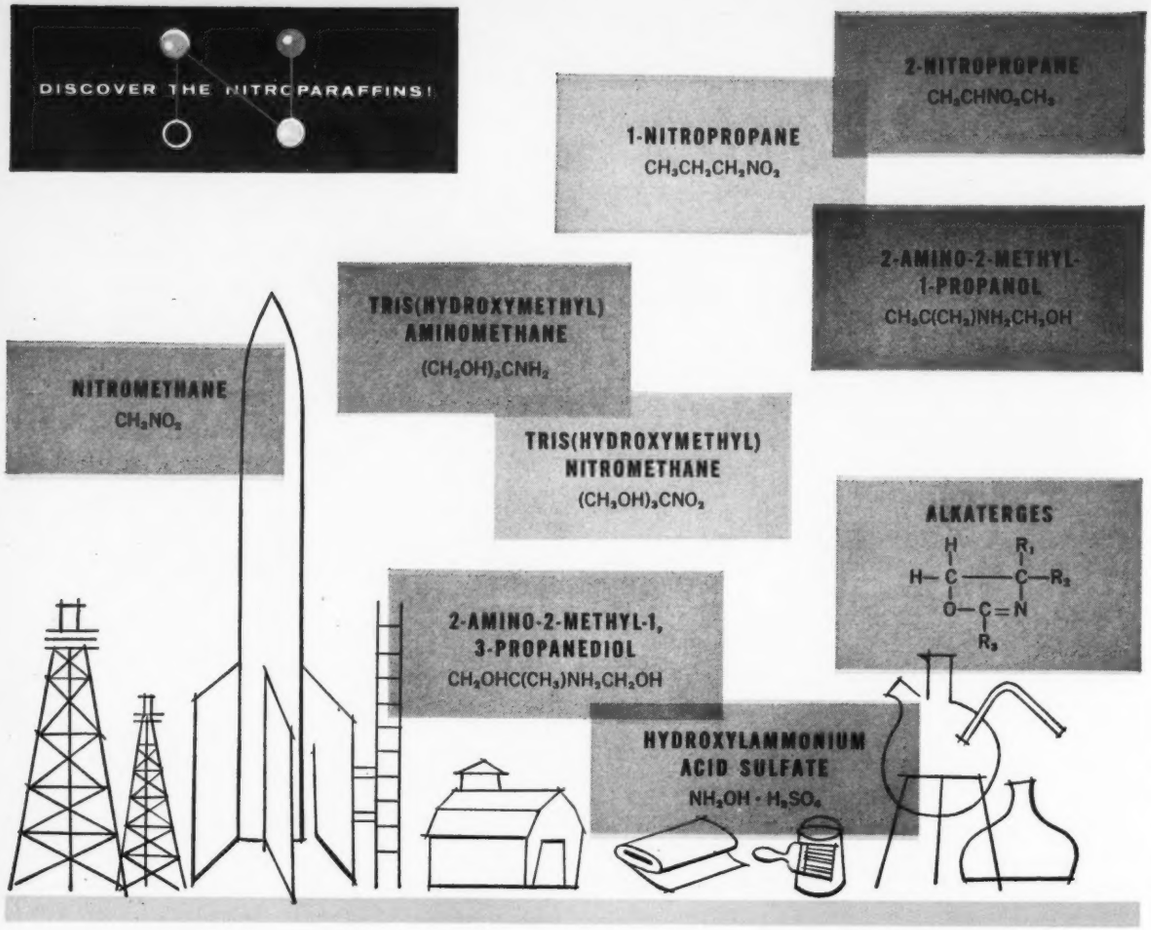

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More is yet to come! The Nitroparaffin family is still under extensive study . . . new products, new applications are still being uncovered. At the same time, production of NP's and their by-products is constantly expanding.

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When inquiring check 3819 opposite last page

CMRA

Starts on page 25

This is shown best by an analysis of job titles of the membership. A surprising 17 percent are presidents, v-p's, or general managers. Just over half of the group are department managers while the remaining 29 percent are market analysts or field representatives.

Yet, in spite of these exalted titles, less than half the members are over forty years old. Over half received their first degree in the years 1935 to 1944. About 65 percent of the members have had 11 to 25 years experience in the chemical industry.

Activities of modern market researchers are varied. The groups probably spend one quarter of their time at the task of analyzing potential markets for products not currently produced. Somewhat more time is devoted to a detailed study of the sales pattern of present products, including an analysis by product type, by geographical area, by application, and by types of customers. Very often projections are made to predict trends. Many companies also use market research to examine the position of their competitors, in what might be called an industrial intelligence capacity. Much less frequently market researchers are called on for studies of the customer's motivation in purchasing or for analyzing the basic strengths or weaknesses of their company.

And although market research has made a major contribution to the present expansion of the chemical industry, it is certainly not an infallible crystal ball nor a cure-all. Good principals of market research practice have been outlined by the Association in a book titled "Chemical Market Research in Practice."

Also, there is a standard problem connected with any data. It has a sense of accuracy to it, whether it is right or wrong. No matter how well a market researcher qualifies his data, the management remembers the numbers and forgets the qualifications.

What of the future of market research in the chemical industry? It is sure to continue its growth with the industry because successful business in the future is certain to become more and more complex, requiring additional help and guidance for management.

chemical business

Spotlight on people

Dr. Gilbert J. Stork, professor of chemistry at Columbia University has received the $1000 American Chemical Society Award in Pure Chemistry. The presentation took place during the 131st national meeting of the ACS. Dr. Stork received the award for his extensive research on the synthesis of such natural products as compounds of the morphine family and the steroids.

Dr. Robert W. Krebs is made director of chemicals research division of Esso Research and Engineering.

New sales manager for Sheffield Chemical, a subsidiary of National Dairy Products, is **Frank J. Drago.**

And at Armour and Company . . . **Dr. John A. King** is appointed director of research.

King

B. F. Goodrich announces the election of **R. G. Jeter** to vice president, general counsel and secretary, and **E. A. Stevens** to vice president and treasurer. In addition to Jeter and Stevens, the following officers were reelected . . . **John L. Collyer,** chairman of the board; **W. S. Richardson,** president; **J. W. Keener,** executive vice president; **Arthur Kelly,** executive vice president; **F. K. Schoenfeld,** v-p for research; **J. A. Hoban,** v-p for marketing; and **H. V. Gaertner,** controller.

Hulse

Dr. Robert E. Hulse, a past member of CHEMICAL PROCESSING's Editorial Advisory Board, is elected executive vice president of National Distillers and Chemical Corporation. At the same time **Robert H. Cornwell, Alden R. Ludlow Jr., Francis Olmsted,** and **Dr. Stuart Schott** become vice presidents of U. S. Industrial Chemical Co., National's chemical division.

Merritt-Chapman & Scott Corporation elects **Herman B. Block** vice president, procurement, and **Herbert S. Maffett** vice president, trade relations.

David M. Kennedy, president and board chairman for Continental Illinois National Bank and Trust Company of Chicago, is elected to the board at Abbott Laboratories.

Alexander N. McFarlane, vice president and general sales manager of Corn Products Refining Company, is elected president of Corn Products Sales Company.

McFarlane

News at Heyden Newport . . . **Robert C. Palmer,** vice president and chemical director of Newport Industries, division of Heyden Newport, retires this month. Palmer will continue to serve as consultant on chemical problems relating to Heyden Newport's entire research program.

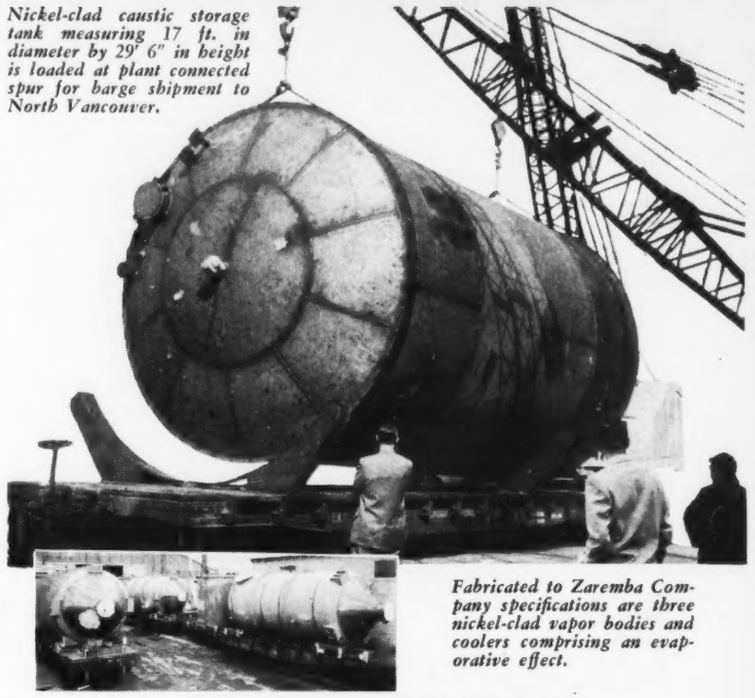
W. R. Grace's polymer chemicals division appoints **Julian A. Rogers** head of manufacturing department of its high density polyethylene plant in Baton Rouge.

New assistant general manager of plastics division, Celanese Corporation of America is **William P. Orr.**

A. Lyndon Foscue, Birny Mason Jr., and **Edwin B. Suydam** are elected vice presidents and appointed members of the appropriations committee of Union Carbide.

Spencer Chemical announces **Sidney N. Gay's** promotion to post of general sales manager for industrial chemicals division.

Nickel-clad caustic storage tank measuring 17 ft. in diameter by 29' 6" in height is loaded at plant connected spur for barge shipment to North Vancouver.



Fabricated to Zaremba Company specifications are three nickel-clad vapor bodies and coolers comprising an evaporative effect.

From blueprints and "Specs" supplied from New York . . .

Puget Sound Handles Complex Fabrication of Nickel and Nickel-Clad Vessels for Hooker Chemicals Ltd.'s New Chlorine-Caustic Plant at North Vancouver, B. C.

Scheduled for completion in July is the new 12 million dollar chlorine-caustic soda plant of Hooker Chemicals Limited at North Vancouver, B. C. The first Canadian chlor-alkali plant west of the Rockies will number among its customers, pulp and paper mills, oil refineries, other chemical plants and adhesive manufacturers for the plywood industry.

Puget Sound Fabricators supplied 19 major custom fabricated vessels ranging from nickel-clad vapor bodies and caustic storage tanks to solid nickel salt receivers and solid monel barometric condensers. The Hooker job is typical of the many eastern firms Puget Sound serves as an "on the spot" source for fabricating in the West. Drawings and specifications were furnished from Hooker Electrochemical Company at Niagara Falls, New York, and the Zaremba Company of Buffalo, New York, specialists in the design of evaporation equipment.

More noteworthy than the great distances separating customers and supplier, were the rigid quality standards of fabrication required. The fabrication of nickel and nickel-clad calls for skilled men and great care. Layout must be handled with precision and welding must be flawless throughout to avoid exposing steel to the corrosive effects of caustic liquors. Puget Sound handled the complex assignment with the highest degree of technical competence.

You can count on this same outstanding fabricating "know how" and conscientious attention on process and plant equipment for any expansion or new plant construction you may be planning in the West. We welcome the opportunity to talk to you and quote prices on any job involving the fabrication of steel and alloys up to 1" thickness.

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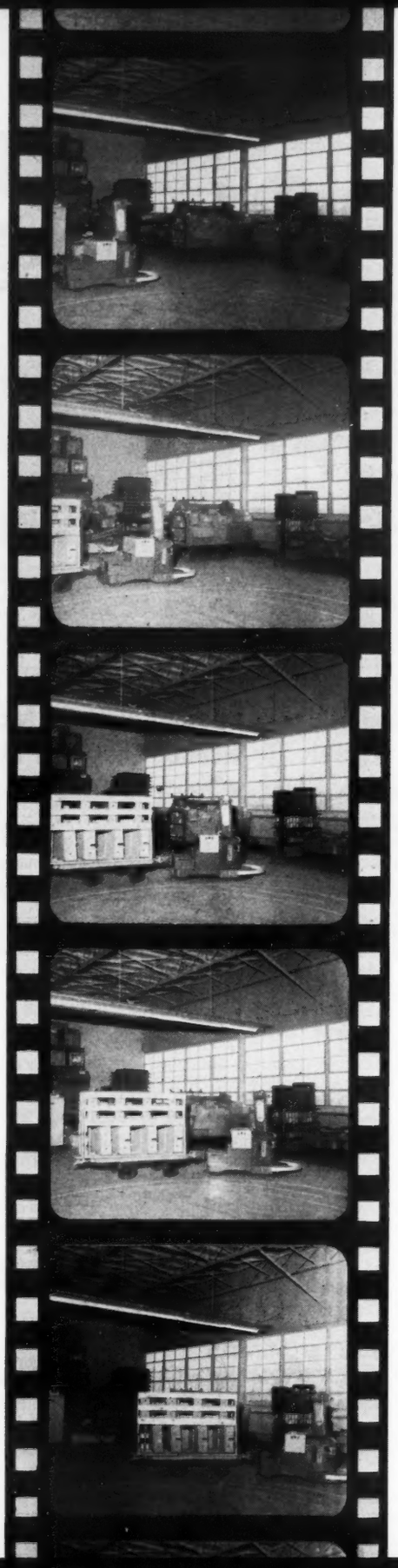


What... No Operator ?

This tractor is being guided by radio waves emitting from wire embedded in floor. Beckett Paper Co. uses one to carry packaged papers from warehouse to shipping . . .

TRACTOR OPERATES WITHOUT A DRIVER

. . . and has solved problem of adapting modern material handling methods to old buildings and layouts

GEORGE MICHAEL, Assistant Editor
JAMES STOLLEY, Process Engineer
Beckett Paper Co., Hamilton, Ohio

Problem: Beckett Paper Co., of Hamilton, Ohio, had a slow and costly method of transferring packaged papers between their shipping department and warehouse — a distance of about 350 ft. They loaded skids on a highway truck, drove the short distance to the shipping section, where the skids were unloaded. The process was repeated over and over.

Like many long-established companies, the plant layout and old buildings do not readily adapt to modern material handling methods. Several conveying systems had been under consideration, but they were not flexible enough to meet existing conditions . . . and, of course, initial cost was of prime consideration.

Solution: Through Pope Equipment Co., Cincinnati, Ohio, Beckett learned of and purchased an electric tractor that operates without a driver. The tractor is controlled by radio waves. Signals transmitted through a guide wire, buried beneath the surface of the route, are picked up by a "sniffer box" mounted on the tractor. By following these signals, the tractor and its train of trailers follow route set by the guide wire. Signals come from transmitting box located at shipping terminal.

The tractor pulls two trailers, hauling about 4000 lb of paper per trip. It stops automatically at the proper loading and unloading stations and is restarted by pushing button on dashboard. It can be made to stop at any desired place by use of several devices — all of which causes the tractor momentarily to lose the signal. Once the signal is lost, motor cuts off and tractor stops instantly.

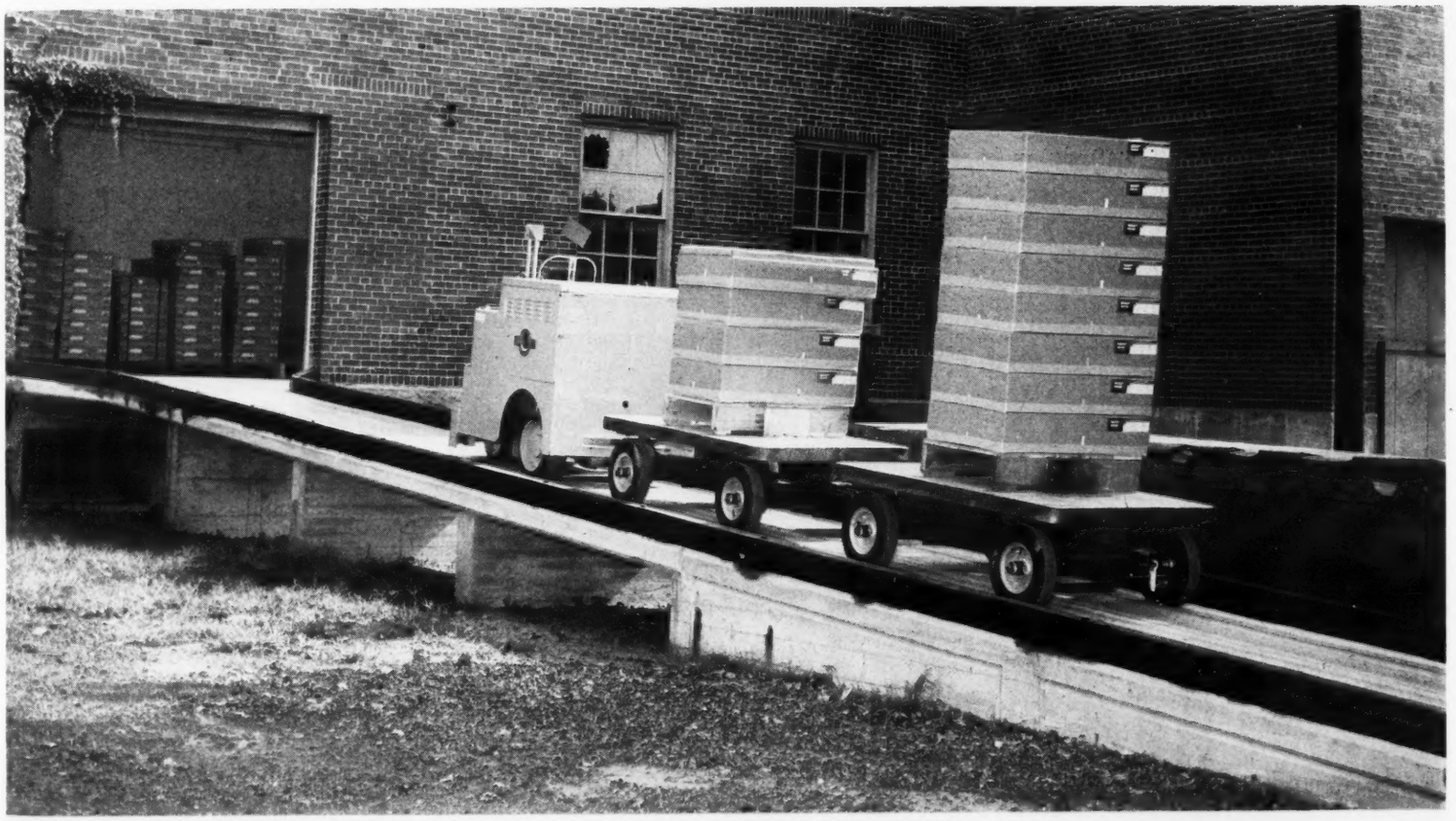
By this time it has passed over the stopping spot, and when restarted continues on the set route. When desired, the tractor can be manually operated for use elsewhere. Sitting on driver's seat disengages the automatic operation.

The tractor is safe, too. It does not stray from its path and its rate of speed can be governed so as not to endanger workers or property (its automatic-operating speed is 2 mph at Beckett). Speed control is precise — speed never varies while tractor is traveling up and down ramps. Accuracy, within which it follows its path, is $\pm 1/2$ inch. If it gets off the path, it stops. The front bumper is spring-mounted, and any pressure on it applies brakes and cuts off motor. There are two kinds of braking — dynamic and electromechanical. When it is not running, brakes are on. Also when it travels down ramp, the electromechanical braking system is automatically applied if the signal system should fail or if the tractor should stray from predetermined path.

Turn to next page

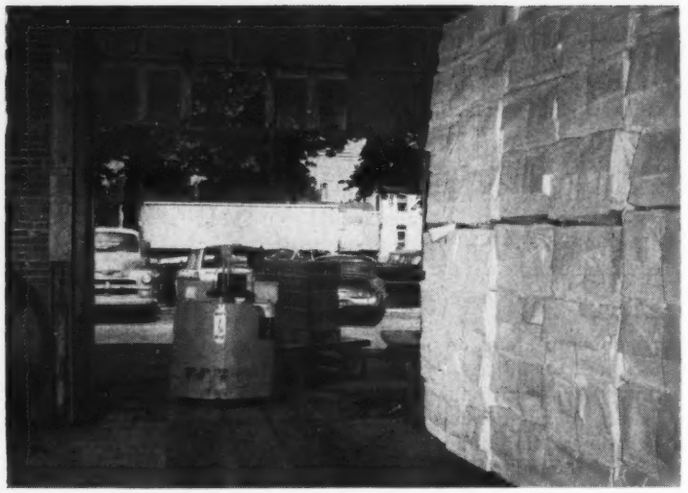
Path of operatorless tractor is shown in this air view of the Beckett plant. Its roundtrip route is from truck dock in warehouse (lower right) to terminal in shipping department (upper left). Roundtrip distance is about 700 ft

Entering shipping department, operatorless tractor travels up ramp with 6.2% slope



Tractor operates without a driver *Starts on page 34*

Tractor needs no driver to guide it into warehouse on its way to truck dock



Tractor is guided by radio waves emitting from wire embedded in floor. Tractor will stop instantly from slight pressure on front bumper

Turning off main warehouse aisle, tractor goes up ramp to truck dock. At truck dock it stops automatically. When loaded, it is restarted and sent back to shipping department

At shipping department terminal, tractor stops automatically. When unloaded, it is restarted, by pushing starter button, and sent back to warehouse area

During a portion of its route, the tractor follows a roadway being used by trailer trucks hauling paper from the mill. The lane followed by the tractor is painted yellow and the tractor itself is yellow, with a flashing red beacon mounted on the front to warn truck drivers of its automatic operation. In addition, signs at entrance to mill warn all vehicles that an automatically controlled tractor is operating in the area.

Results: Tractor has solved the problem of adapting modern material handling methods to the plant. Its initial cost was low, compared to other methods considered, and there has been a definite saving in operating costs over the old method.

Unit is able to operate outside in all kinds of weather, travel up and down ramps, and make very tight turns. Flexibility is such that Beckett can plan on using it wherever they desire. All they will have to do is add to or change the track of guide wire.

Another application is being considered for the operatorless tractor — that of hauling pulp and other raw materials from storage to processing department.

(Guide-O-Matic operatorless tractor is manufactured by Barrett-Cravens Co., Dept. CP, 630 Dundee Rd., Northbrook, Ill. . . . or for more information check 3821 on form opposite last page.)

Scrubber at refinery handles gas from sulfur burner as well as decomposer gases . . .

flexible, low-maintenance unit carries bigger load efficiently

At a major southwestern refinery unusual feature of wet-type scrubber in sulfuric acid plant is that it not only handles gases from sulfur combustion chamber but also those obtained from an acid sludge decomposer. This unusually heavy load has been handled satisfactorily by the unit since it was placed in operation in 1954.

Scrubber has to be highly flexible since the production rate of the plant varies from 125 to 300 tons of sulfuric acid per day, according to demand. This is evident as shown by following operating conditions:

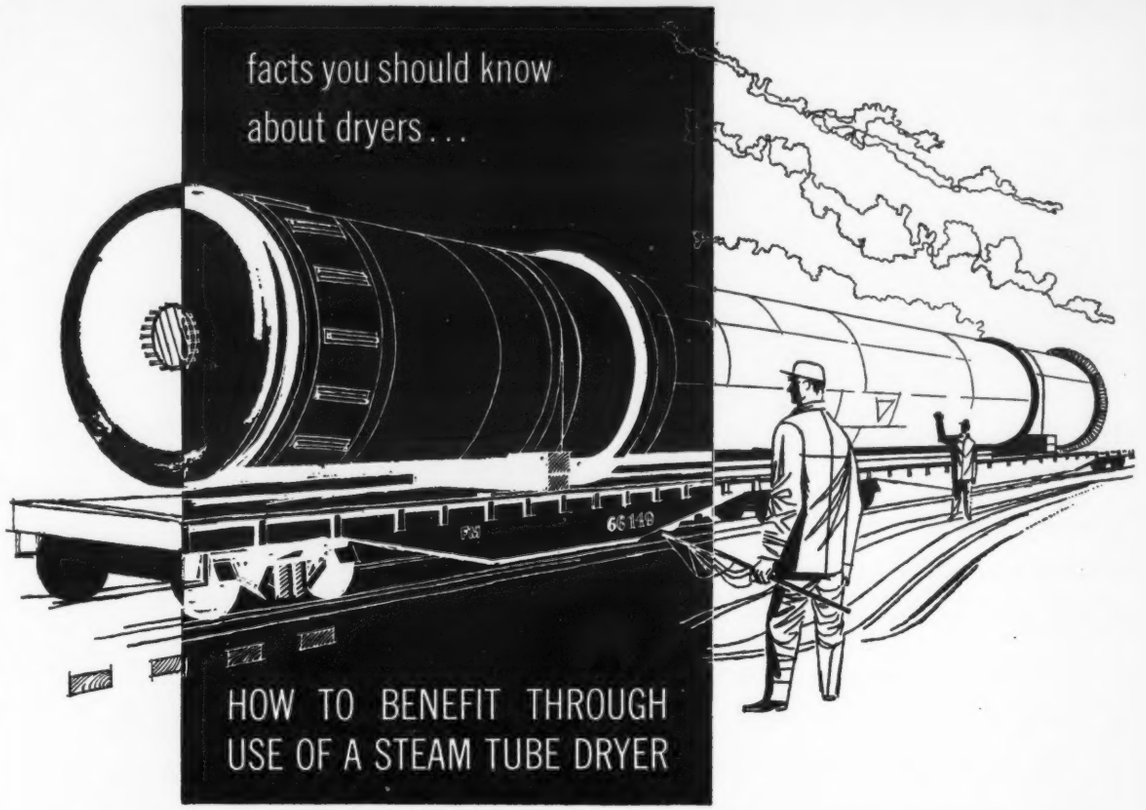
Gas to scrubber	1700-2100°F
Gas leaving humidity section	141-155°F
Gas leaving cooling section	102°F
Fresh water temp in	88°F
Water for cooling	575-950 gpm
Volume of gas in	8000-13,500 scfm
SO_2 in water to sewer	0.03%

About 50 to 80% of the gases going into scrubber consist of sulfur gases coming from combustion chamber resulting from burning sulfur. Remaining 20 to 50% of gases handled by scrubber come from acid sludge decomposer. This acid sludge, obtained from acid-treating operations, is decomposed into coke, SO_2 and light hydrocarbon gases. SO_2 and light hydrocarbon gases go to sulfur combustion chamber. This raises temperature of gases and increases load on scrubber.

Combination of gases from combustion chamber passes into bottom of humidifying section of scrubber and is cooled to 155°F with water from spray nozzles. Gases then pass upward through perforated trays across which water is flowing. This cools gas to 102°F. Gas then goes to mist precipitators, drying tower, heat exchangers, and converter. Water is stripped of SO_2 and then passes to sewage disposal system.

Corrosion-resistant materials have been used throughout acid plant to minimize maintenance. Duct coming out top of combustion chamber is made of Meehanite. One corrosion-resistant blower furnishes air for stripper that removes SO_2. This enables unit to produce five tons more acid per day. Duct coming out top of scrubber, which carries gas to mist precipitator, is made of lead. Type 41 Haveg is used for weak acid piping. Plant is also going to this plastic for stripper shell.

(Scrubber is product of Peabody Engineering Corp., Dept. CP, 232 Madison Ave., New York 16, N.Y. . . . or for more information check 3822 on form opposite last page.)



For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. This experience can often be applied to provide unusual benefits in specific cases, possibly yours, for example . . .

Q. *Since avoiding dust loss and contamination by furnace gases indicates the choice of an indirect heat rotary dryer for my material, what type of indirect dryer would you recommend?*

A. Unless there are abnormal conditions, *we would recommend a steam tube dryer*, especially if the material is heat sensitive.

Q. What advantages does the steam tube dryer offer *in comparison with indirect fire types?*

A. There are many advantages. One is ease of operation and low maintenance costs due to the definite moderate temperature (established by steam pressure) imposed on both the material being dried and on the dryer itself. Another advantage is that there is no furnace refractory maintenance. Still another advantage is quick "warm up" and "cool off". In many cases where the drying operation is intermittent, there is no need to shut off the steam supply or stop rotation when the wet material feed is interrupted since steam is condensed in quantity only when wet material is fed.

Q. *Isn't steam supposed to be an expensive drying medium?*

A. That depends on how the steam is used. It is true that a low overall efficiency results (often as low as 25%) when steam is used to heat air for low temperature drying. However, the Louisville Steam Tube Dryer normally utilizes 85% or more of the available heat in the steam. By combining this with a reasonable minimum efficiency of 80% in modern small steam generators (and higher in large boiler plants), you get an overall efficiency close to 70%. This compares with indirect fire dryers which develop an efficiency seldom higher than 50% and generally less.

Q. *Does material insulate the tubes by sticking to them or by clogging the spaces between tubes?*

A. Very few materials have this tendency to any serious extent and most of these, when properly conditioned before feeding, handle without difficulty. For the balance, no dryer using heated surfaces for heating the material is a proper application.

Q. *How can I be sure a Steam Tube Dryer will handle and dry my material satisfactorily?*

A. The General American dryer pilot plant is at your service. No charge for routine tests and demonstrations. No obligation, either. Write for test date.

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

LOUISVILLE DRYING MACHINERY UNIT

GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer General Sales Office: 139 So. Fourth Street, Louisville 2, Kentucky
Eastern Sales Office: 380 Madison Avenue, New York 17, New York
In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada
General Offices: 135 S. La Salle Street, Chicago 90, Illinois

When inquiring check 3823 opposite last page

King-size storage tank made of aluminum

Low cost and satisfactory corrosion resistance were factors that caused Mississippi River Chemical Company, Crystal City, Mo., to choose aluminum for construction of a large tank recently installed for storage of ammonium nitrate. Tank is 100' in diameter and 33' high. It is fabricated from 5052-H112 aluminum plate over interior structural members of 6060 aluminum. Metallic inert gas-shielded welding process was used in fabrication of tank.

(Aluminum was furnished by Reynolds Metals Co., Dept. CP, 2500 S. 3rd St., Louisville 1, Ky. . . . or for more information check 3824 opposite last page.)

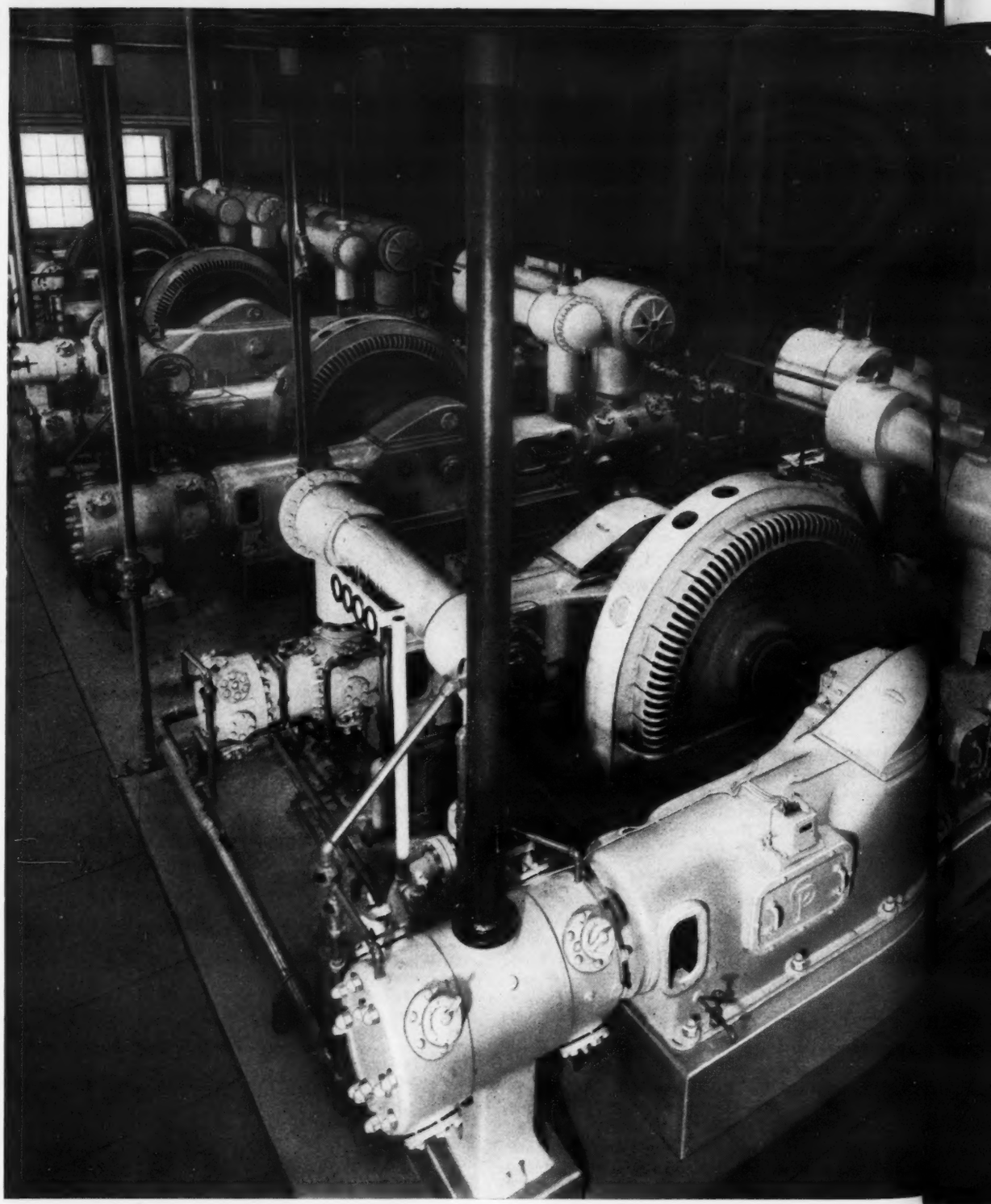
(Tank was fabricated and erected by Nooter Corporation, Dept. CP, 1400 S. 2nd St., St. Louis 4, Mo. . . . or check 3825 opposite last page.)

Control of humidity, temperature required fast-closing, safe, automatic door controls . . .

photoelectric beam operates doors between manufacturing area and shipping locations

Problem: Difficulty of maintaining constant humidity and temperature control in textile manufacturing areas with manually-operated doors was making air conditioning a costly proposition at plant of Tennessee Eastman Co, Div. of Eastman Kodak Co., Kingsport, Tenn. Entire area for production of Chromspun and Estron acetate yarn is air conditioned, but because finished yarn must be moved to storage and shipping areas, there is constant flow of traffic through large doors and loss of conditioned air.

Solution: Company found that photoelectric controls would operate doors quickly, safely, and automatically. When horizontal beam is intercepted by vehicle, doors open immediately. Diagonal safety beam keeps doors open while vehicle is passing through doorway. When vehicle has passed and beam is no longer broken, it immediately actuates closing of door. Door operator

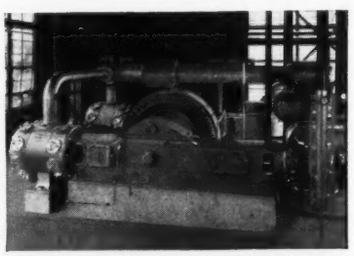


Four-stage Class H Compressors meet air liquefaction demands in a steel plant.

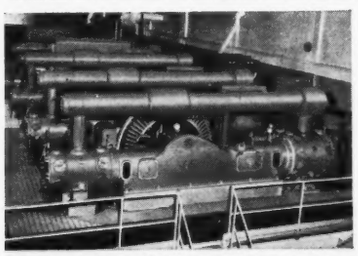
Low Speed FOUR-CORNER COMPRESSORS

- *maximum availability*
- *minimum attention*
- *greatest accessibility*
- *readily adapted to multi-staging*

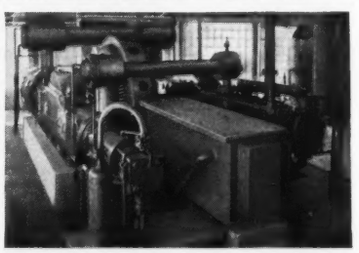
Chicago Pneumatic duplex, four-corner Class H Compressors afford optimum flexibility in arranging cylinders for one to six stages of compression, with correct distribution of load. These Class H Compressors, with motor or steam drive, are built in sizes to 2,000 horsepower for vacuum service or pressures to 15,000 psig. Other types available up to 5,000 horsepower.



Class H, three-stage compressor installed in a chemical plant.



A pair of Class H, two-stage compressors supplies air in a West Coast installation.

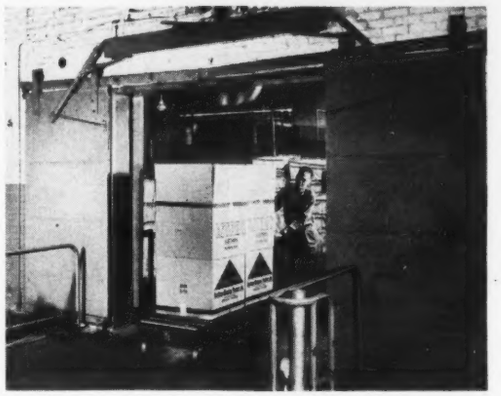


Five-stage, four-corner 3,000 psig compressor in Japan — the first of three.

Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

When inquiring check 3826 opposite last page

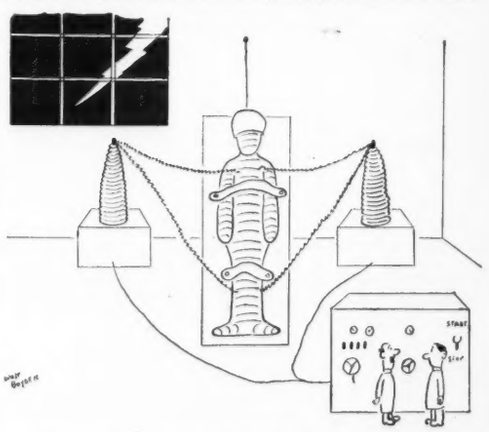


Automatically-operated doors permit economical control of loss of conditioned air in production areas

is controlled by two horizontal opening rays and one diagonal safety ray. Device can handle two doors weighing up to 800 lb and operating across an opening width of 77 to 96".

Results: By using photoelectric controls to operate doors company has realized five advantages: 1) system provides economical control of loss of conditioned air in production areas; 2) time taken to open and close doors has been saved and trucks get to shipping areas faster; 3) trucks do not bang into doors—factor that reduces much maintenance work; 4) automatic door operation has proved safer, minimizing accidents and injury to personnel; 5) employes appreciate convenience of automatically opening doors.

(Automatic door opening equipment is product of The Stanley Works, Dept. CP, 111 Elm St., New Britain, Conn. Check 3827 opposite last page.)



"Frankly, Purvis, I just don't like this."

Thanks to Walter L. Boyden, Kaiser Chemical and Aluminum Corporation, Tacoma, Washington.

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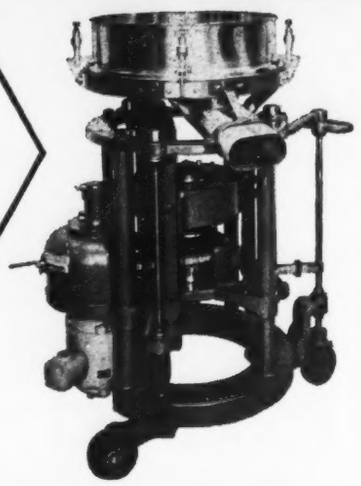
Vorti-Siv



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The Hoshall Company, 1414 Morningside Drive, Atlanta, Georgia — Fla. Ga. N. C. S. C. Tenn.
The Moore Drydock Co., Ft. of Adeline Street, Oakland, California — Calif.
Wm. B. Sanford, Inc., 601 West 26th Street, New York, New York — Conn. Del. D. C. Me. Md. Mass. N. H. N. J. N. Y. Pa. R. I. Vt.
Webster Equipment Co., 549 W. Randolph Street, Chicago, Illinois — Ill. (Northern) Wis.
G. R. Williams Sales, 1619 Progress Street, Lincoln Park, Michigan — Mich.
Sada y Himes S.A., Apartado 911, Padre Mier 1250 Pte., Monterrey, N.L. Mexico — Mexico

When inquiring check 3828 opposite last page

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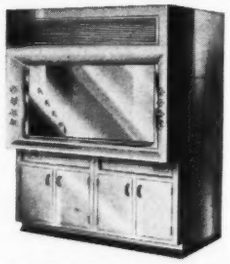
- Exclusive 5-point METCOTE protection throughout.
- Interlocked construction and double welded.
- Bonderized cold rolled furniture steel.

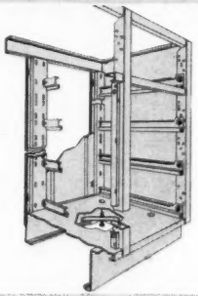
Since your laboratory is a "Testing-Ground" and a source of improved processes and products . . . it deserves the finest equipment. Our planning service is available without any cost or obligation.

Specify METALAB and you are assured of having equipment that is completely versatile, functional, and adaptable to future operational requirements.

The equipment shown here features entire units and illustrates METALAB precision engineered interchangeable type construction.



METAL-AIRE "FLOLINE" FUME HOOD
Developed for minimum-velocity air flow consistent with efficient fume removal. Designed by the outstanding manufacturer of laboratory furniture and equipment.



METALAB CONSTRUCTION
This cut-away view of a standard cabinet is an example of METALAB's precision engineered construction. You can interchange drawer and cupboard units by means of this unique design.

METALAB *Equipment Company*
DIVISION OF [illegible] CORPORATION
230 Duffy Avenue, Hicksville, L.I., New York

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When inquiring check 3829 opposite last page

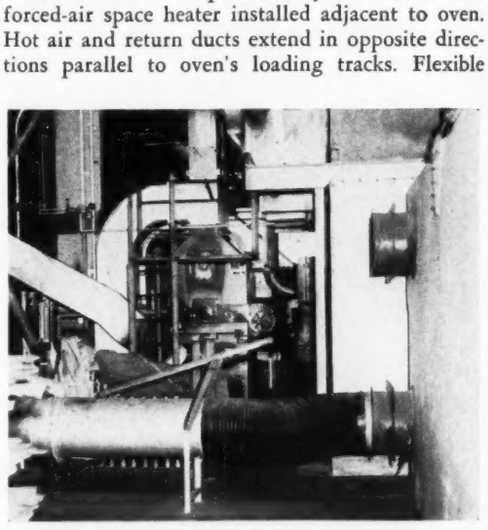
Magnesium discoloration halted by eliminating condensation with pre-heater . . .

metal sheets are gradually pre-heated to 250°F over a four-hour period

Problem: Condensation caused damaging discoloration when magnesium sheets at normal temperatures were placed in 700°F thermal flattening oven at Dow Chemical Co.'s Madison, Ill., magnesium mill.

Solution: To eliminate condensation Dow installed an insulated sheet metal pre-heat chamber. Load of magnesium sheets is gradually elevated to 250°F over a four-hour period. Measuring approximately 32 x 10 x 8′, chamber is large enough to enclose two cars loaded with a total of 55 tons of magnesium. Equipped with crane lifting lugs, chamber is moved from one side of oven to the other. While one load is being preheated, other loaded cars are moved into position on opposite side of oven, so that flattening process is conducted on a continuous basis.

Heat for chamber is provided by one million Btu forced-air space heater installed adjacent to oven. Hot air and return ducts extend in opposite directions parallel to oven's loading tracks. Flexible



Forced-air space heater helps control damaging condensation on sheet metal at Dow's magnesium mill

hose connections are installed at ends of ducts for easy bolting to proper blast gates of pre-heat chamber. Air is fed into chamber at rate of 11,000 cfm.

Heater is equipped with a modulating gas burner and uses fuel in accordance with heat build-up needed after each four-hour shift of pre-heat oven. Stainless steel combustion chamber resists scaling and oxidizing at high temperatures, and provides high heat transfer. Return air from pre-heat chamber is passed over economizer tubes and then over combustion chamber to regain heat lost.

Results: Condensation has been eliminated,

putting an end to troublesome production problem. Damaging discoloration of metal no longer occurs.

Heaters similar to one used on pre-heat chamber are providing shirt-sleeve warmth in the 1.2 million sq ft production area. A total of 110 units are in service at the plant ranging in capacity from 1.65 to 2 million Btu delivering 16,500 and 22,000 cfm of 80°F air respectively.

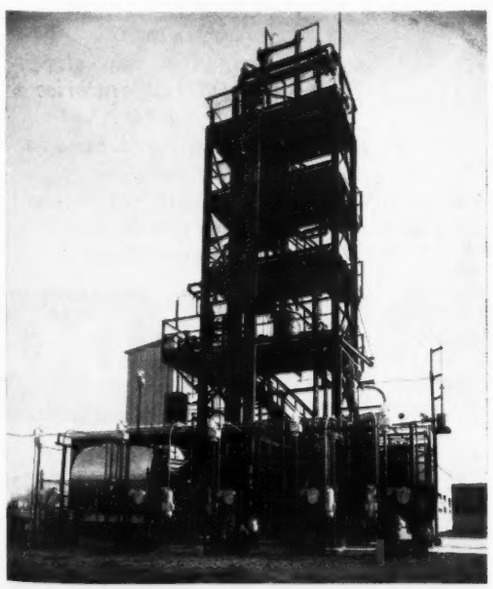
(Counterflo forced-air space heaters are product of Dravo Corp., Dept. CP, Neville Island, Pittsburgh 25, Pa. . . . or for more information check 3830 on form which is located opposite last page.)

Submerged vertical turbine pumps provide continuous flow of volatile liquids . . .

self-lubricated units help maintain high quality of ether made at E. R. Squibb

Continuous flow of volatile liquids in a vaporization process is furnished by submerged vertical turbine pumps at the Montreal anesthetic ether plant of E. R. Squibb & Sons of Canada, Ltd., Montreal, Quebec. The plant produces 200 lb of ether per hour. Pumps prevent vapor lock usually encountered when liquids being pumped have higher vapor pressure than water.

A buried tank stores ethyl alcohol, the raw material used to produce the ether. One pump feeds alcohol to a sulfuric acid reactor. Pumping assembly is sub-



Ethyl ether plant at E. R. Squibb & Sons

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• CESCO distributors are experienced safety specialists. They know how to work with safety directors, personnel directors and plant management to help in the choice of the finest safety equipment available. They are well stocked with equipment that has stood the test of time in industrial plants everywhere.

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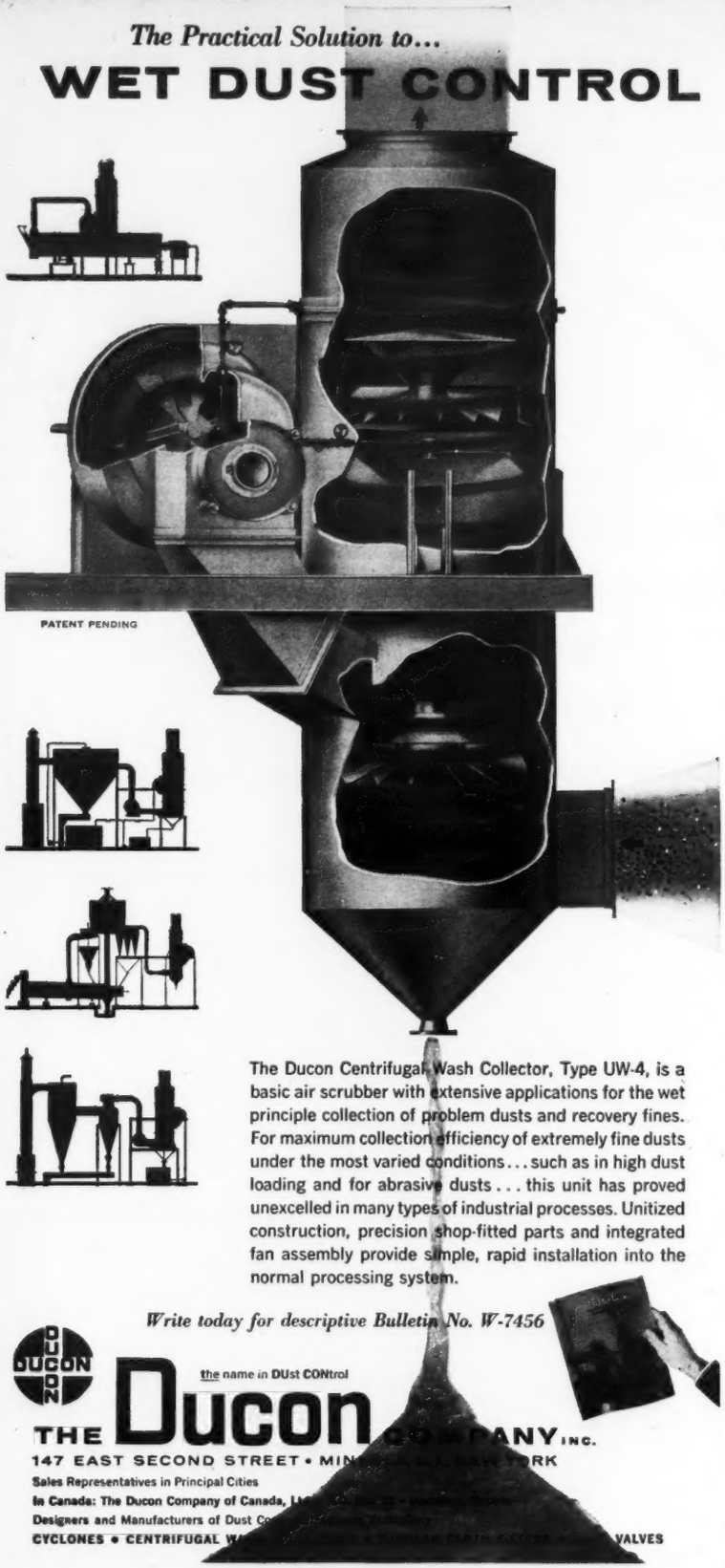
WET DUST CONTROL



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CYCLONES • CENTRIFUGAL W... VALVES

When inquiring check 3832 opposite last page

merged in alcohol tank and requires no suction lift. This prevents premature vaporizing within pump.

Vapor from reactor flows to a caustic scrubber and then to an ether still and an alcohol recovery still.

In the process, the ethyl alcohol is dehydrated to produce ethyl ether, which is deposited in three collecting tanks for preliminary testing purposes. A submerged turbine pump in each of the three tanks pumps ether into two large finished ether tanks at a rate of 20 gpm. After further testing of finished ether, two other turbine pumps deliver it from large tanks to automatic filling line. After filling, ether is tested a third time. Quality standards require the ether to be reworked if it is rejected at any of three testing points.

Pump is designed for handling volatile solvents

Self-lubricating feature of the submerged pumps helps maintain the purity of the product. Pump is lubricated by the ether itself and requires no oil or other lubricant that might contaminate the end product. Submerged pump is successful in this service because it does not depend upon suction lift to move the volatile liquids. Even a small amount of suction often causes vaporization, which could lead to failure of a conventional pump.

(Vertical turbine pumps are product of The Deming Co., Dept. CP, Salem, O. . . . or for more information reader may simply check 3833 on form which is located opposite last page.)

Shortage of industrial water supply threatened drastic curtailment of plant operations . . .

departmental metering saves water and money

Problem: "We can't give you any more water," said water-works officials to Merck & Co., Inc., of Rahway, N.J. Failure to conserve water would prevent operation of additional plant processing facilities, and would probably even curtail normal production, the company was told.

Something had to be done about relieving the critical shortage. Like most industrial plants, Merck had only several large meters to measure intake of water from city. These meters could not provide needed data on water usage for various plant operations.

Solution: To get factual data on actual use, water meters were installed in all departments. They were read monthly and tested periodically to maintain highest degree of accuracy.

Results: Since installation of meters in all departments, there is substantial reduction in water

Odorants

FOR INDUSTRY

Within several months time the D&O Industrial Perfume Laboratories have developed, on request, masking odors or covering fragrances for:

RUST PREVENTIVE
GLASS CLEANER
INSULATING MATERIAL
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An individually tailored industrial odorant may be the sales assist your product needs to make its way in today's competitive market. The D&O Laboratories can produce it . . . at a realistic cost. Send us a sample of your unperfumed product and let us make specific recommendations.

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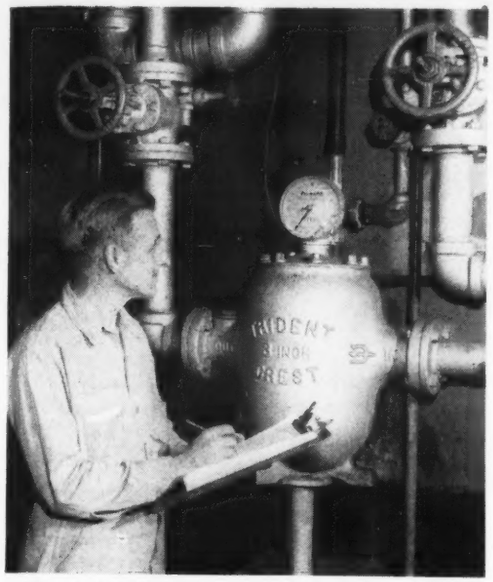
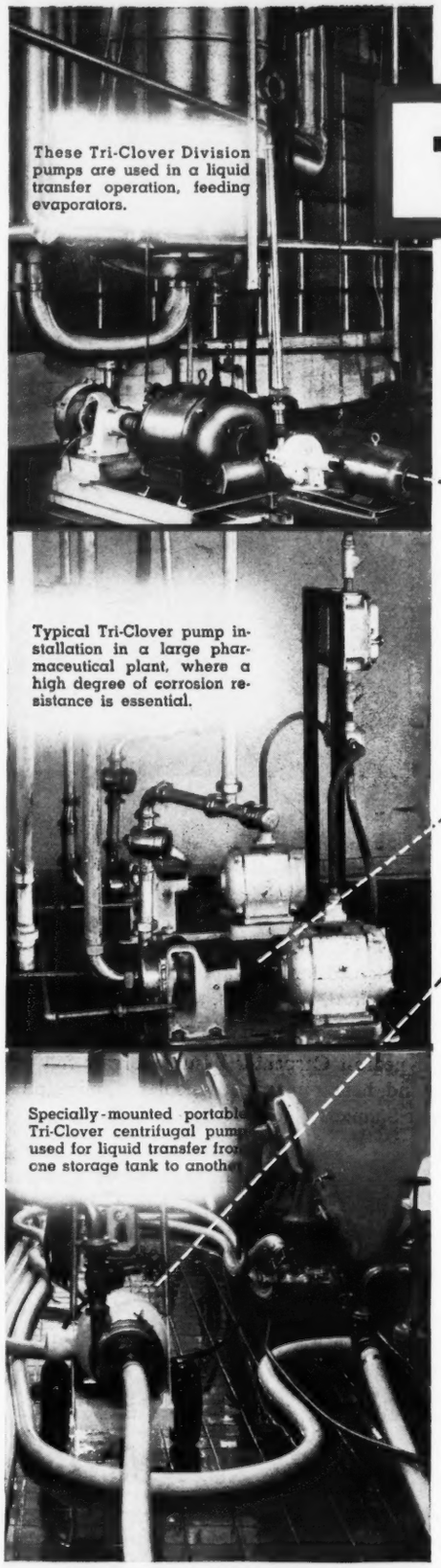


Three-inch turbine meter is one of many measuring water at Merck & Company plant in Rahway N.J.

consumption and water costs. Operators realize that water is charged-for, the same as gas and electricity.

While helping conserve and more efficiently utilize water, metering has also reduced pumping costs. An awareness of need for water conservation and factual data on its actual uses have also stimulated engineers to design and develop processing facilities requiring minimum quantities.

(Water meters are product of Neptune Meter Co., Dept. CP, 19 W. 50th St., New York 20, N.Y. Check 3835 on form opposite last page.)



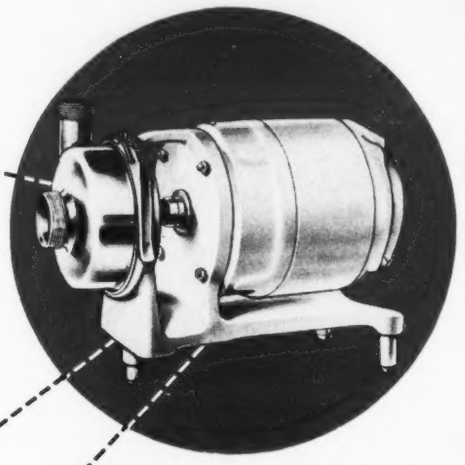
These Tri-Clover Division pumps are used in a liquid transfer operation, feeding evaporators.

Typical Tri-Clover pump installation in a large pharmaceutical plant, where a high degree of corrosion resistance is essential.

Specially-mounted portable Tri-Clover centrifugal pump used for liquid transfer from one storage tank to another

TRI-CLOVER

CENTRIFUGAL PUMPS



..an efficient solution to corrosion-resistant pumping problems

Available in stainless steel, nickel alloy, bronze and cast iron, Tri-Clover Division pumps are designed for efficient liquid transmission with high resistance to corrosion. These modern pumps offer many exclusive features, including patented screw type impellers with quick-acting impeller clips, lightweight heads with a minimum of parts, casing construction permitting fast, easy assembly or disassembly—and a wide choice of seals for various applications.

Tri-Clover's exclusive developments are the result of many years of specialized engineering experience and thorough knowledge of liquid handling. Let our engineering staff work with you in solving your pumping problems.

See your nearest Tri-Clover distributor, or write:

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EXPORT DEPT., 8 S. Michigan Ave., Chicago 3, USA Cable: TRICLO
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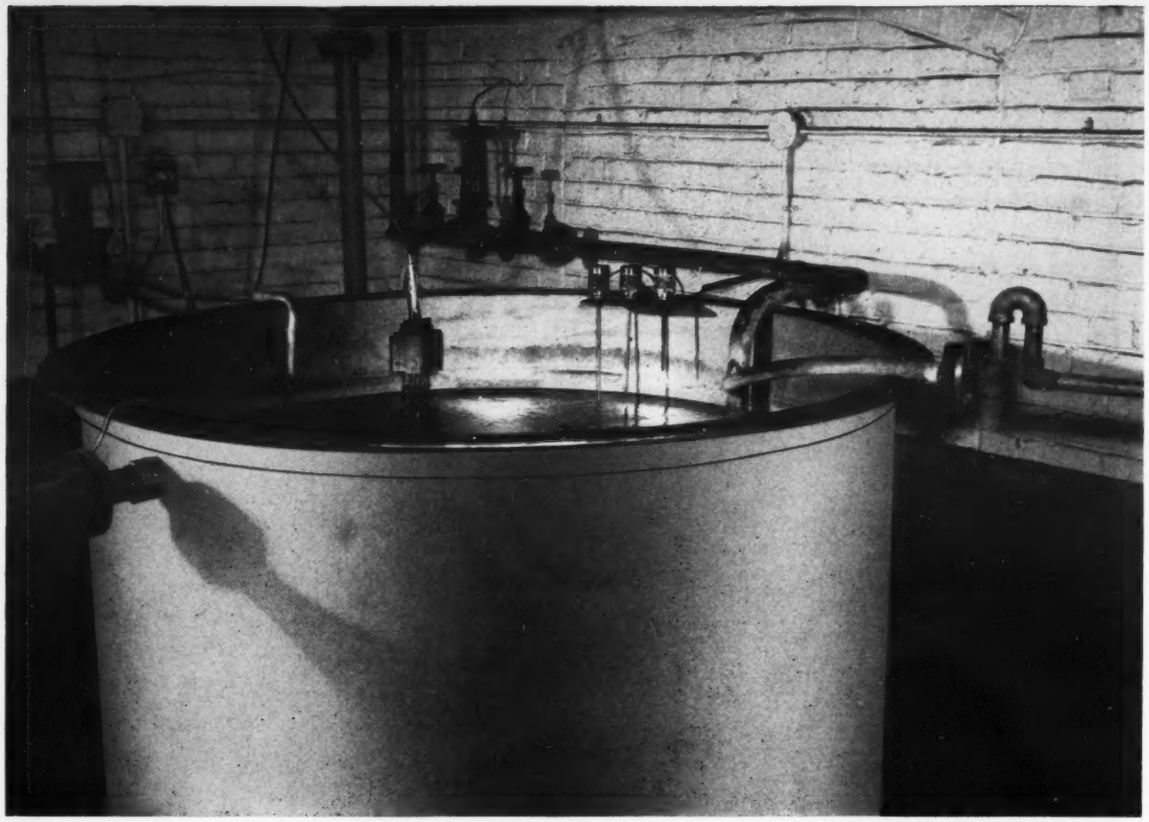
When inquiring check 3836 opposite last page



Another plant tames sulphuric acid with *Carpenter* Stainless No. 20 and No. 20Cb

An automatic sulphuric acid dilution system, with Carpenter Stainless No. 20 and No. 20Cb preventing corrosion at critical points, is cutting acid costs and reducing dangerous acid handling for a Tennessee textile plant. Savings with the system in its first year of operation equaled the total initial cost. Carpenter No. 20 and No. 20Cb control corrosion attacks of H_2SO_4 concentrations up to 23% in a cutting tank (shown above), piping and pumps.

Whether you have sulphuric acid solutions or other strong corrosives to handle, see how Carpenter Stainless No. 20 and No. 20Cb can help you cut corrosion costs by keeping acid handling equipment on the line longer.

Write for a copy of the Carpenter Stainless No. 20 and No. 20Cb handbook containing physicals, corrosion resistance and fabrication data.

These super corrosion-resistant alloys are available in tubing, pipe, sheet, plate, bars, strip, wire and billets to meet your exact requirements.

See your nearest Carpenter Distributor for full information and help on your particular application for Carpenter Stainless No. 20 and No. 20Cb.

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

Carpenter

pure than corrosion resistance

Stainless No. 20 & No. 20Cb

Carpenter No. 20 bars, strip, wire and billets are available also from The Carpenter Steel Company, Reading, Pa.

When inquiring check 3837 opposite last page

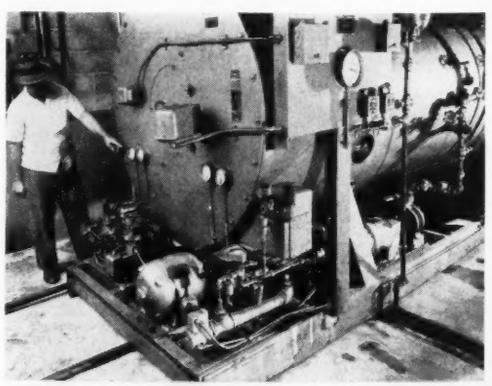
Hardy hose helps push seaway project

Abrasive mixture of mud, water, and glacial till is handled 24 hours a day through this tough suction hose at the St. Lawrence Seaway project. Material pumped is so abrasive that it is necessary to change teeth of excavation shovels once a shift. Hose is reinforced with heavy hose duck plies and coated steel wire to prevent crushing or collapsing. Already in use over six months, hose is expected to last another two years.

(Cascade suction hose is manufactured by B. F. Goodrich Industrial Products Company, Dept. CP, Akron, Ohio . . . or for more information check 3838 on form opposite last page.)

Packaged steam generator saves fuel in tank truck cleaning operation

Problem: Steam generator used at P. B. Mutrie Motor Transportation, Inc., Wallingford, Conn., to supply high pressure steam for cleaning tank trucks had excessive fuel cost. More than 400 different types of chemicals and other prod-

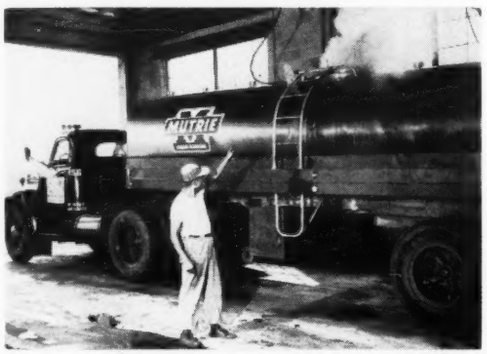


This 125-hp packaged steam generator furnished all the steam needed for purging 20 to 30 trailers daily as well as steam for heating building

ucts are transported by the company. Trailers must be cleaned when shifting from one type of liquid cargo to another.

Solution: When Mutrie built a new terminal, a 125-hp packaged steam generator was installed. Unit serves dual purpose of furnishing steam for cleaning tanks and also for heating adjacent building. Formerly, separate boiler was needed for this purpose. From 10,000 to 12,000 gallons of water are used every day for heating and cleaning purposes. Packaged steam generator has 500 sq ft of heating surface and supplies up to 4312 lb of steam at 60-70 psi per hour.

Results: Packaged steam generator, burning No. 5 fuel oil, effects saving of about 30% from kerosene formerly used. Fuel costs have been lowered some four cents per gallon. Maintenance



Stainless steel trailer being steamed clean at the Mutrie terminal

has been limited to daily blowdown and daily cleaning of the electronic scanning lens, which watches flame and relays signal to shut off fuel in event of flame failure. Steam generator will be shut down once a year for cleaning of boiler tube.

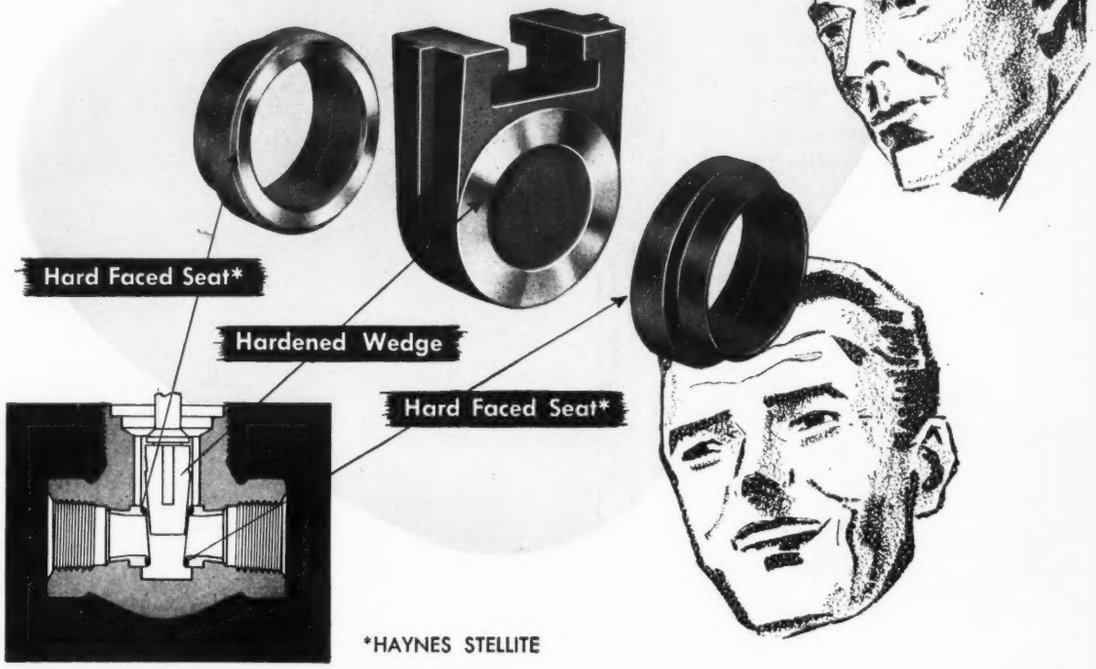
(Packaged steam generator is manufactured by York-Shipley, Inc., Dept. CP, York, Pa. . . . or for more information check 3839 on form opposite last page.)

NOMOGRAMANIACS AND CARTOONISTS —

WHEN YOU submit cartoons and nomographs to CHEMICAL PROCESSING for consideration, please be sure that your return address is complete and correct. It's impossible to mail your acceptance check or to return unaccepted work if the address isn't right.

As a matter of fact, we are now holding some checks for contributors whose addresses we don't have. If you've seen your work in CHEMICAL PROCESSING, or if you haven't heard from us for a reasonable length of time, drop a note to Data Editor, CHEMICAL PROCESSING, 111 East Delaware Place, Chicago 11, Illinois.

Tough valve buyers appreciate this kind of... Toughness



*HAYNES STELLITE

Here's why:—They know that to foil those troublesome valve "termites"—erosion, corrosion, and galling—requires built-in toughness which only seats faced with hard facing alloys AND hardened wedges can provide. Yes, it takes BOTH to do a real job and GP Valves provide both at no extra cost!

Vogt GP Valves feature the toughest and, since they are precision finished, the smoothest seating surfaces obtainable anywhere. That's why they are setting new standards of performance—longer, drop-tight service with minimum, low cost maintenance—in petroleum refineries, chemical plants, power plants and other industries. Available in a complete range of sizes from ¼" to 2" and rated 800 pounds at 850° F. and 2000 pounds at 100° F.

Advt. No. 5 in a series describing the features of Vogt GP Valves.

Write For Your FREE COPY of Supplement No. 1 to Catalog F-9. Dept. 24A-FCP.

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Vogt GENERAL PURPOSE GP Vogt FOR BETTER VALVES

DROP FORGED STEEL

VALVES

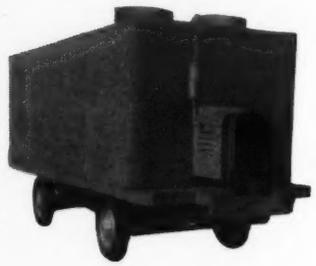
HAYNES STELLITE—Trade-mark of Union Carbide and Carbon Corporation

When inquiring check 3840 opposite last page

Repair time on hot tank cut in half through use of mobile cooler

Problem: Large liquid oxygen tank, needing maintenance and repair, was difficult to work in for more than short periods of time, at a large chemical company in New Orleans, Louisiana. Because of the heat and exposure to the sun, exterior of tank maintained a temperature of about 130°F, making it extremely uncomfortable inside. Men were bothered with dermatitis caused primarily by profuse perspiration and fine particles in the air.

Solution: Company cooled tank by means of a mobile air conditioning unit. Mounted on a 4-wheel trailer, unit uses ice as cooling source, avoiding use of



Sixty-ton capacity mobile cooler uses ice, is 15 ft long

expensive components and cutting down initial and operating costs. Through use of nylon ducts, machine is easily and quickly installed in any available opening.

Initial cost of cooler averages less than $150.00 per ton capacity. Operating cost is $5.00 to $8.00 per hr. Units are small — a 60 ton machine is only 15 ft long. They come in standard sizes from 20 to 60 ton capacity.

Results: Mobile cooler quickly lowered temperature of tank to 70° and cut maintenance time in half. Job that formerly took 10 days was finished in 5 days. Workers no longer complained about skin rash. Tank's interior was so comfortable that most of personnel were eating their lunch there. Air conditioner may also

CONSOTROL* RECORDING C

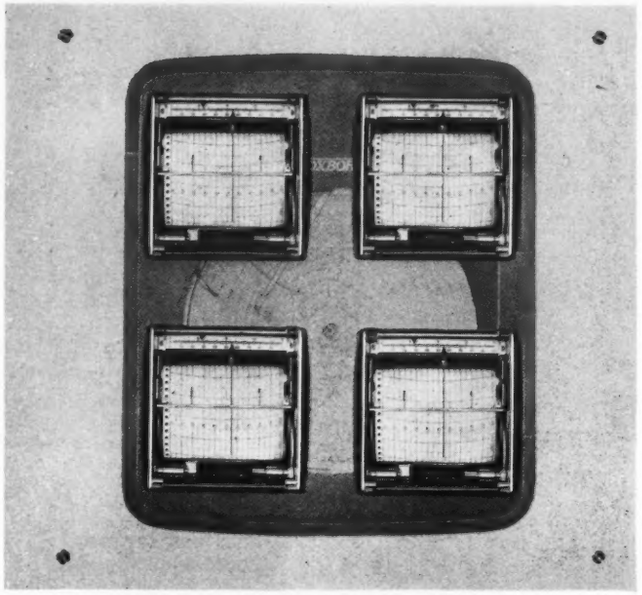
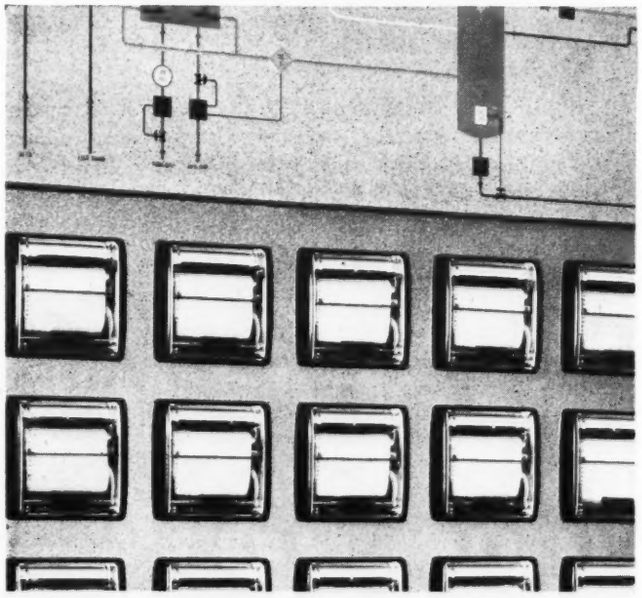


Illustration shows how 4 Consotrol Instruments require less panel space than does a single, conventional 12" recorder.



Typical control panel showing Consotrol Recording Control Stations. Associated M/58 Controllers, integrally mounted, pull out with the recorders.

The ORIGINAL small-case control panel instrument with a

FULL SCALE 4 INCH CHART...

Full-scale *readability!* Here is the industry standard set by Consotrol Instruments, with no compromise in compactness, convenience, or performance.

These Recorders and Recording Control Stations are so compact you can actually mount 4 in the space required by 1 standard 12-inch recorder. And yet, inside the case, all components are full size — nothing is "miniature."

With the integrally mounted Model 58 Controller, the Foxboro Consotrol Recording Control Station provides precise, dependable control and full-scale chart records in one-quarter the panel space. Maintenance is easier too, with all calibration adjustments made from the front . . . re-inking needed only twice a year . . . chart changes as seldom as once a month.

For the complete story, write for Bulletin **816. The Foxboro Company, 816 Neponset Avenue, Foxboro, Massachusetts, U.S.A.**

INTRODUCED IN 1952 — OVER 25,000 NOW IN USE

*Reg. U.S. Pat. Off.

FOXBORO

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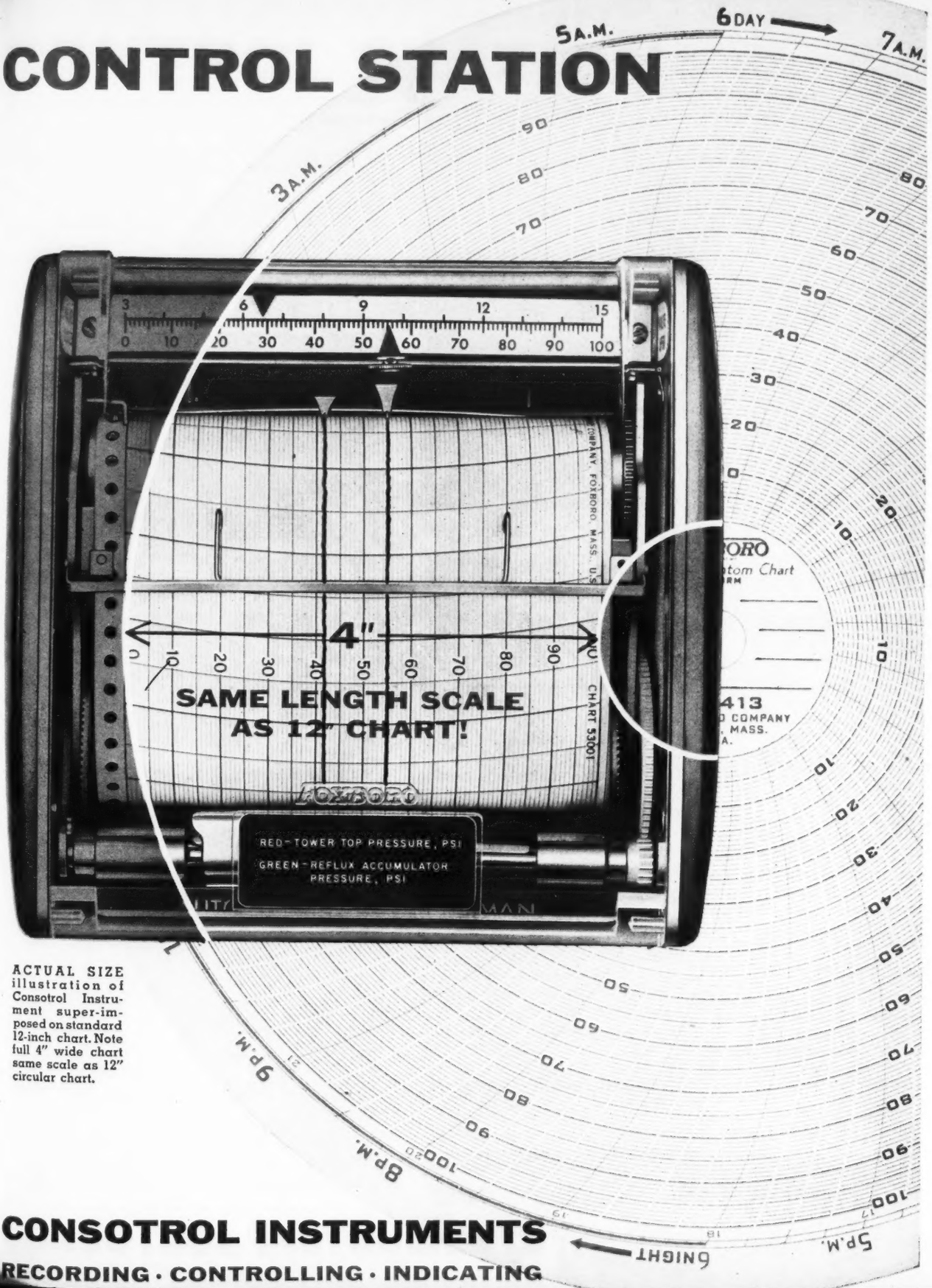
CONTROL STATION



ACTUAL SIZE illustration of Consotrol Instrument super-imposed on standard 12-inch chart. Note full 4" wide chart same scale as 12" circular chart.

CONSOTROL INSTRUMENTS

RECORDING · CONTROLLING · INDICATING

be used for quickly cooling down and maintaining healthy atmosphere in other hot areas.

(Mobile Ready Cool conditioners are product of South House Inc., Dept. CP, 2301 American Bank Building, New Orleans, La. . . . or for more information check 3841 on form which is located opposite last page.)

Time, labor, space saved in destroying material with crusher . . .

unit is compact, simply constructed, and easy to operate

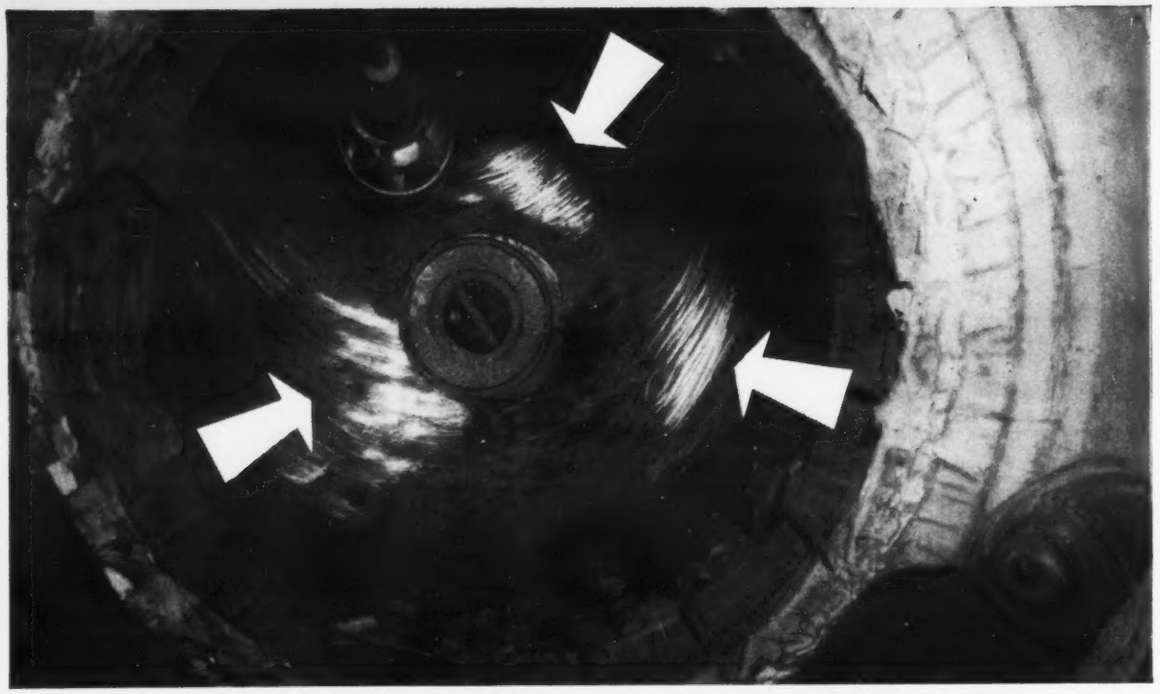
Problem: Finding more efficient means of disposing outdated, soiled, or damaged pharmaceuticals which were originally put up in 5 cc to 1 gallon bottles was an annoying problem at White Laboratories, Inc., Kenilworth, N.J. Valuable storage space was wasted while material was accumulating. Extensive handling was required, and it was necessary to regularly assign temporary help to disposal duty.

Solution: To correct this condition a 12" single-roll crusher was installed to perform disposal operations. Unit has low power requirements and high wear-resisting qualities.

Results: Simplicity and ease of operation of unit have eliminated need for assigning extra help to disposal operation. Time required for destruction of non-reclaimable material has been reduced by two-thirds. Wasting of valuable storage space, and costly and time-consuming handling have also been eliminated.

(Single-roll crusher is product of Sprout, Waldron & Co., Inc., Dept. CP, Muncy, Pa. . . . or for more information check 3842 on form opposite last page.)

For more information on product at left, specify 3843 . . . see information request blank opposite last page.



This large carbon-molybdenum steel valve was a total loss unless a dozen or more internal cracks could be repaired. Job was done by welding with Inco-Rod "A" electrode.

Preheat was impossible . . . yet Inco-Rod "A" saved this valve for Consolidated Edison

At first, repairing this throttle valve looked like a real headache to the Welding Department of Consolidated Edison.

The casting is made of carbon-moly steel. In service, a dozen cracks . . . some 3 inches deep . . . had developed inside its 4-inch-thick wall.

Ordinarily this would not present too great a repair problem. Use a carbon-moly electrode. To prevent air-hardening of the weld metal, *be sure to preheat to 300°F.*

But that was the catch! The valve was too big for preheating . . . and weldors would have to work inside.

A few of the cracks after welding.

Fortunately, Thomas Reilly, General Foreman, knew about Inco-Rod "A"* electrode. (Even with Inco-Rod "A" electrode, preheating is recommended when required to protect some base metals, although it is not needed for the weld metal itself.) Since the valve was a total loss, anyway, he decided it was worth a try to salvage it with Inco-Rod "A" electrode.

Working without preheat, weldors built up welds in the cracks. In a few hours the valve was saved. And today it's performing perfectly . . . operating at 950°F. and 1650 psi.

If *you* want strong, sound joints whether in repair work or in production welding of dissimilar alloys . . . consider Inco-Rod "A" electrode. A helpful folder, just off the press, gives you data on many test welds made with this electrode . . . informative case histories, too. Write today for your copy.

Inco-Rod "A" electrode gives these advantages

Versatility—This one electrode produces X-ray quality welds in *many* dissimilar alloy combinations: among ferritic and austenitic stainless steels . . . low alloy and mild steels . . . high-nickel, and other alloys.

Ease of use—With its spray-type arc, Inco-Rod "A" electrode is *easy*-handling in all positions. Slag removal is easy, too.

Corrosion resistance—Joints made with Inco-Rod "A". . . the electrode with the distinctive green flux coating . . . usually have equivalent or better corrosion-resistance than the alloys being welded.

Registered trademark

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N. Y.

INCO-ROD "A" electrode is supplied in 14-inch lengths in four diameters, 3/32-, 1/8-, 5/32-, and 3/16-inch (the 3/32-inch is center grip) . . . packed in 5-lb. asphalt-lined containers.

INCO **Welding Products** • electrodes, wires, fluxes

When inquiring check 3844 opposite last page

NEW SOLUTIONS of processing problems

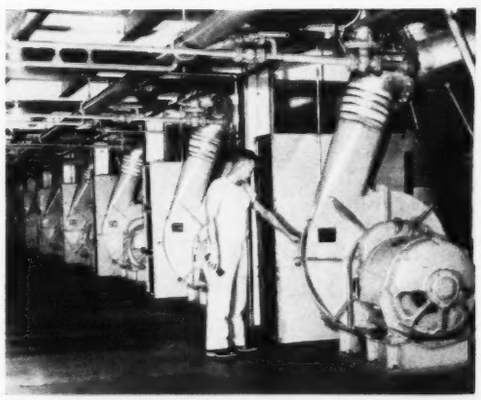
Draw economical electrical energy from dependable gas engines coupled to generators . . .

220 units have a total combined operating time of 8.1 million hours with little maintenance

Gas-burning radial engines used to drive generators for DC power supply at Aluminum Company of America's Point Comfort, Texas, Smelting Works have a combined dependable operating time of 8.1 million hours. Maintenance material and parts required for overhaul have been very low. These high performance and low maintenance cost figures are very significant contributions to reduction of production costs:

Portion of 220 radial gas engines driving generators that supply over 4 million kw-hr per 24 hr at Alcoa's Point Comfort, Texas, Smelting Works

A total of 220 engines, with a maximum capacity of over 400,000 horsepower, are now installed at the Point Comfort Works. Production requires generation of well over 4 million kw-hr per 24 hr. Engines are two-cycle with spark-ignition and burn natural gas. They have 12 cylinders of 14" bore and 16" stroke. Rated at 2125 hp at 400 rpm, they drive 1330 kw, 667 volt DC generators. Each engine-generator unit has its own stack which handles engine exhaust, generator cooling air, and air from heat exchanger.



Centrifugal blowers feed filtered air at rate of 7000 cu ft/min to power cylinders of radial engines

Scavenging air for engines is water washed as it enters building and then filtered. Centrifugal blowers send air at rate of 7000 cu ft/min to power cylinders.

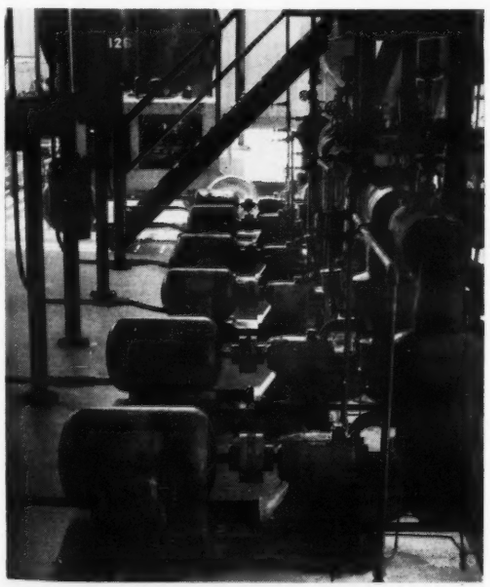
(Radial engines were supplied by Nordberg Manufacturing Co., Dept. CP, Milwaukee, Wis. . . . or for more information reader may simply check 3845 which is located on form opposite last page.)

(Centrifugal compressors were supplied by Buffalo Forge Co., Dept. CP, 465 Broadway, Buffalo 4, N. Y. . . . or for more information about manufacturer's product reader may simply check 3846 on the convenient Reader Service slip which is located opposite last page.)

Fatty acids at 520°F pumped continuously with no trouble

Centrifugal pumps used at Newport Industries, Bay Minette, Ala., have given excellent service for more than two years handling fatty acids at temperatures up to 520°F. In the same service at another fatty acids plant, pumps used had to be frequently repaired and replaced.

Reason pumps at Newport Industries have stood up well, according to J. P. Krumbein, Ass't Chief Engineer, is that they are well constructed and very durable. Design allows easy servicing. Pumps are



Pumps in fatty acid service at Newport Industries

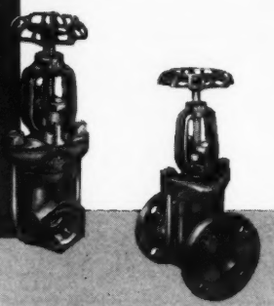
Turn to page 51

for longer valve life

in a variety of corrosive services

JENKINS NI-RESIST

GATE VALVES



Where you encounter acids, salt and alkaline solutions, sea water, brine or other corrosive fluids, vapors or gases, you'll want Jenkins Ni-Resist Type 2 Cast Iron Gate Valves with type 316 stainless steel trim. They have a remarkable ability to withstand destructive corrosion and erosion.

In paper mill service, food processing, petroleum refining, chemical plants and other process industries, Jenkins combination of Ni-Resist type 2 cast iron and type 316 stainless steel, plus Jenkins extra *value* construction throughout greatly extends valve life.

Designed especially for corrosive services, the Jenkins Ni-Resist line of gate valves also has superior metal-to-metal wearing qualities. Copper-free, they will not discolor or contaminate products being carried in the line. Let the famous Jenkins Diamond be your guide when choosing Ni-Resist valves . . . it means longer, trouble-free service.

GET COMPLETE INFORMATION
from your Jenkins Distributor, or write Jenkins Bros., 100 Park Avenue, New York 17.

JENKINS VALVES

LOOK FOR THE JENKINS DIAMOND

JENKINS SINCE 1864 Jenkins Bros.

Sold Through Leading Industrial Distributors Everywhere

When inquiring check 3847 opposite last page

Refractory Castables are SPECIALIZED

Which are best to use in refinery units?

Naturally, the type of refractory castable selected depends upon the specific service. B&W makes a line of specialized refractory castables which are being widely used in catalytic reformers and catalytic cracking units, as well as in furnaces, ducts and stacks. For easy reference, here are some typical applications together with the recommended B&W Refractory Castables:

APPLICATION	DESIRABLE PROPERTIES	RECOMMENDED B&W CASTABLES
Linings of catalytic reformers	Extremely low iron content, extra high strength. Extremely low iron content, plus good insulation. Low iron content, high temperature use limit.	Kaocrete LI Kaolite LI Kaocast
Lining desulphurizers	Good workability	Kaocrete B
Transfer lines and regenerators of catalytic cracking units	Extra abrasion and erosion resistance.	Kaocrete D
Heads of reactors and regenerators	Plasticity, excellent workability.	Kaocrete B
Insulating furnace floors	Good insulation, light weight	Kaolite-20 Kaolite-22
Tube sheets	Good insulation, light weight	Kaolite-20 Kaolite-22
Burner blocks	High temperature use limit, refractoriness and spalling resistance.	Kaocast
Openings where doors and other points are subject to mechanical abuse	Extra abrasion and erosion resistance	Kaocrete D
Furnace doors	Good insulation, light weight	Kaolite-20 Kaolite-22
Ducts and stacks	Good insulation, light weight	Kaolite-20

Bulletin R-35 contains additional information on B&W Refractory Castables. Send for your copy.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

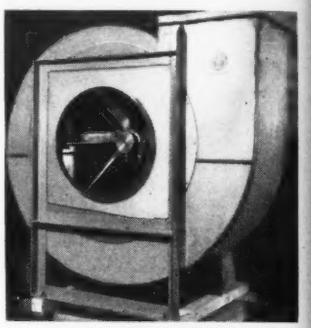
BABCOCK & WILCOX
THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R-862

NEW SOLUTIONS

Jumbo stainless steel fan defeats corrosion and heat

Large blower constructed of 18-8 SMo stainless steel has given excellent service for more than a year at a midwestern plant as an induced draft fan on an incinerator for burning residue from used barrels and drums. Driven by 10-hp motor, fan wheel is over 4' in diameter. Unit delivers 17,800 cfm at 1½" static pressure.



Large exhaust fan is used to remove high temperature gases of combustion

Fan is exposed to severely corrosive chemicals and subject to erosion of entrained residues from the burning chamber. Gases and material go through water wash before reaching fan. Temperature at fan is 450°F, and gases contain traces of sulfuric acid with high moisture content. Although subject to high temperatures and highly corrosion conditions, fan is still in good condition and performing satisfactorily after one year.

(Exhaust fan was designed and built by General Blower Co., Dept. CP, Morton Grove, Ill. . . . or for more information check 3848 on form opposite last page.)

(Enduro 18-8 SMo is product of Republic Steel Corp., Dept. CP, Cleveland 1, Ohio . . . . or for more information check 3849 on form opposite last page.)

For more information on product at left, specify 3850 . . . see information request blank opposite last page.

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U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

New Polyethylene Bottle Has Built-In Sterilization

A manufacturer has introduced a self-sterilizing polyethylene bottle in which a permanent type antiseptic is incorporated in the resin at the time it's molded. The product seems to be an effective answer to an old problem: how to sterilize a polyethylene container without subjecting it to high heat.

Self-sterilization by chemical means is not new, having been used for a number of years in textiles, leather and plastics. However, the new polyethylene bottles are believed to represent the first successful use of the principle in this field. Until now, polyethylene bottles which required sterilization have been irradiated, a costly process that offers less permanent protection than many chemical antiseptics.

In the new product, a liquid germ-killer (nature not disclosed), is added to the polyethylene as it goes into the mold. As little as one gallon is claimed to render 5,000 lbs. of resin self-sterilizing for an indefinitely long time.

The new bottles are expected to find wide acceptance in the drug and pharmaceutical fields.

Methionine Plays Role In Adrenal Gland Function

A recent study reports evidence that methionine is beneficial to Vitamin C metabolism and to the functioning of the adrenal glands.

It was found that methionine increased the Vitamin C content of the adrenal gland in experimental animals. A high level of Vitamin C in the adrenals is known to help these glands function better. Vitamin C is necessary for the utilization of the adrenal cortex hormones, especially for the salt metabolism they control.

Of three sulfur-containing amino acids studied, only methionine had this effect.

U.S.I. and Mallory-Sharon Form New Subsidiary to Melt and Fabricate Zirconium

Reactive Metals, Inc. Will Concentrate on Ingots and Mill Products to Help Speed Growth of Zirconium Industry

Formation of Reactive Metals, Inc., a joint enterprise of U.S.I.-National Distillers and Mallory-Sharon Titanium Corp., marks another step in the evolution of zirconium from a specialty business into a full-fledged commercial industry. For the present, the new company will melt zirconium and its alloys and will manufacture zirconium mill products. Production will be expanded soon to include hafnium, and later to include other metals of value to the atomic energy program.

New ingot melting facilities will be constructed at Ashtabula, Ohio, site of U.S.I.-National Distillers' new zirconium sponge plant. Auxiliary facilities will be provided to insure production of sound ingots, both alloyed and unalloyed, ready for fabrication to any type of product. Mallory-Sharon's years of experience in melting and fabrication of titanium will be utilized to the fullest extent.

Will Ease Supply Situation

Formation of the new subsidiary will make it possible for users to buy zirconium sponge or platelets from U.S.I.-National Distillers, or finished ingots, billets or mill products from Reactive Metals at firm prices with firm delivery dates.

Common sizes of ingots and billets will be carried in stock. This will greatly reduce existing procurement delays.

U.S.I.-National Distillers has lowered the price of zirconium sponge considerably through technical advances, but the company feels that similar progress must be made in melting and fabrication before zirconium

MORE

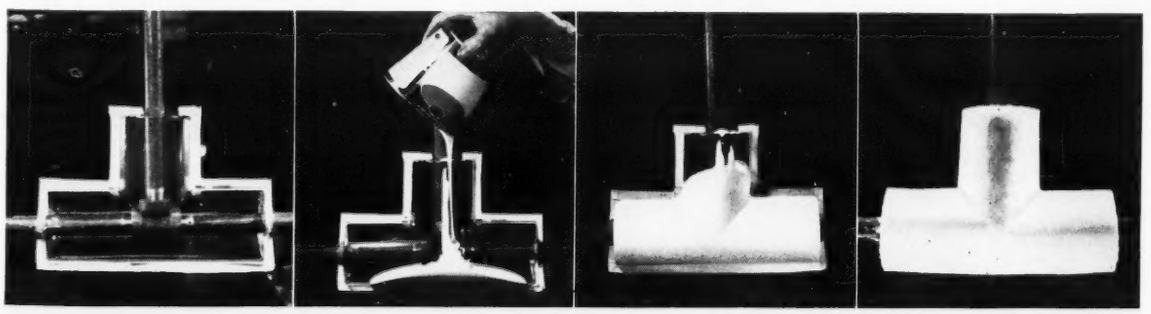
Titanium Gets Chrome Coat

A method for electrodepositing a chrome coat on titanium has been developed by the National Bureau of Standards after years of research on the problem of bonding the two metals. The purpose of the coating is to overcome the tendency of titanium to seize or gall in loaded contact with itself or other materials, and to prevent oxidation of the metal at elevated temperatures.

Availability of coated titanium should result in greater use of the metal in many equipment applications where seizing and oxidation have presented difficulties.

Up until now researchers have been unable to bond any metal to titanium, due to the formation of an oxide film on the titanium surface during handling in the bonding operation. With the new method, the oxide film is removed from the titanium surface and is immediately replaced by a fluoride film. Oxide can no longer form. When the titanium is placed in the chrome plating bath, the fluoride film dissolves away, leaving a clean surface and allowing the chromium to bond directly to the base metal.

Pipe Joint Gets Urethane Foam Insulation In Place



Versatile urethane foam is formed on the job, makes insulating easy. Transparent mold is set up around pipe joint. After mixing polyisocyanate with polyester, mix is poured into mold. U.S.I. ISOSEBACIC Acid can be used as intermediate for polyester component.

Urethane polymer is formed by mixing of the two chemical components and carbon dioxide gas is given off during reaction, causing polymer to foam in place. Polyurethane foam hardens almost at once, and mold is removed. Photos courtesy Nopco Chemical Company.

U.S.I. CHEMICAL NEWS

New U.S.I. Booklet Updates Information on Sodium Dispersions

A new 44-page technical bulletin just released by U.S.I. contains much new information on techniques and equipment for using sodium dispersions in pilot plant and full scale reactions. U.S.I., a pioneer in the development of sodium dispersions and their adaptation to commercial use, was the first to present to the chemical industry a technical bulletin on this interesting branch of sodium chemistry.

The new publication describes the most recent advances in engineering techniques and equipment to achieve higher yields and reaction rates, improved reaction control, economy of reagents and new uses of sodium dispersions. Methods for converting liquid sodium to dispersion form on a commercial scale are discussed, as are continuous processes.

Sodium dispersions and high surface sodium (sodium-coated particles) are two forms of metallic sodium with a tremendous amount of active surface area. These forms give sodium greater usefulness in a growing number of chemical reactions.

The comprehensive new technical bulletin, "Sodium Dispersions", is available on request from U.S.I.

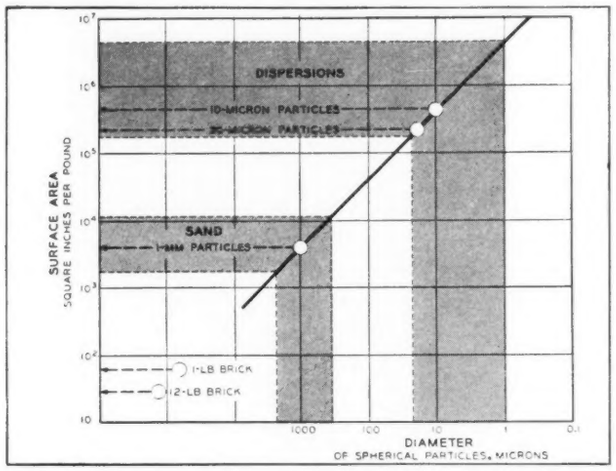


Chart reproduced from booklet shows available surface areas for reaction of several forms of metallic sodium. Dispersions offer about 100 times as much area as sodium sand and about 10,000 times as much area as uncut sodium bricks. High-surface sodium (sodium-coated particles) can offer even more surface area per pound of sodium.

CONTINUED Subsidiary

can fulfill its proper role in the metals and chemical industries. This purpose is to be served by the new jointly owned subsidiary. Backed by the technical and financial resources of the parent companies, it will devote its efforts solely to the processing of zirconium and other reactive metals.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing the Editor, U.S.I. Chemical News.

Non-toxic developer for blueprints is said to combine advantages of potash or hydrogen peroxide with these additional features: does not clog drains; washing after development may be omitted; excellent recovery from fading. **No. 1230**

New technical data sheets on trimethyl and triethyl aluminum have just been published. Both compounds are used as fuel ignitors in ram and turbojet engines, as polymerization catalysts and intermediates. **No. 1231**

An atomic flashlight said to provide light for many years without the aid of batteries or external power sources has been developed. It uses an essentially non-hazardous radio-isotope. Can be made in many sizes and shapes. **No. 1232**

Over 50 reactions of fatty alcohols are described in detail in a new 16-page brochure. Technical data on unsaturated aliphatic and saturated aliphatic alcohols are given, and the bibliography cites 70 references. **No. 1233**

Polyethylene pipe with ribs that protect the pipe wall and increase its resistance to burst is now being fabricated. The closely spaced ribs extending lengthwise of the pipe are also said to facilitate stacking of coils. **No. 1234**

Pigment Extenders, Flatting Agents and Filter Aids are discussed in a brochure which also contains many formulas for solvent and water-thinned paints. Each formula is on a separate sheet for easy removal and binding. **No. 1235**

Nitrogen-15 enriched to 95% is now available in a number of reagent chemicals. This important tracer isotope has not been previously available in higher than 60% purity. **No. 1236**

Sodium tetraphenylboron, a popular reagent for potassium determinations, is now offered as a high-purity reagent with individual lot analyses. The compound has a minimum assay of 99.5%. **No. 1237**

Isotope Boron-10, until recently restricted to AEC requirements, is now available in kilogram amounts for civilian use. The material, which resembles powdered graphite, is valued at nearly three times the price of refined gold. **No. 1238**

A de-watering press embodying new and novel features has passed pilot model tests and is available in commercial models. It is said to embody all advantages of a hydraulic press, yet is continuous in operation. **No. 1239**

PRODUCTS OF U.S.I.

METALS

Titanium Sponge
Zirconium Sponge and Platelets
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OTHER PRODUCTS

Inorganic Chemicals: Sodium, Chlorine, Caustic Soda, Sodium Peroxide, Sodium Sulfate, Sulfuric Acid, Phosphoric Acid, Ammonia, Nitrogen Fertilizer Solutions, Ammonium Nitrate.

Alcohols: Ethyl (pure and all denatured formulas), Normal Butyl Amyl, Fusel Oil; Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

PETROTHENE® Polyethylene Resins

Esters, Ethers and Ketones: Normal Butyl Acetate, Dibutyl Phthalate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone, Diato®.

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Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curbay B-G® 80, Special Liquid Curbay®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B_{12} and Antibiotic Feed Supplements, Vacatone® 40, Vitamin A, D_3 and K_3 Products, Antioxidant (BHT) Products, Special Mixes.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.

U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers Products Corporation
99 Park Avenue, New York 16, N. Y.

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Starts on page 49

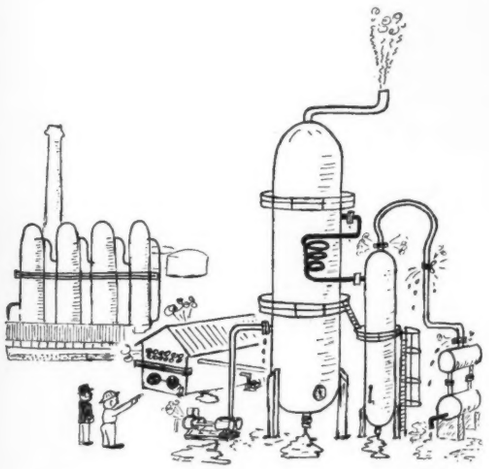
made so that different impellers can be used in same casing. This permits one unit to handle a sizeable range of pumping jobs. Units are suitable for continuous service.

Pumps are made of Elcomet K alloy, which has following composition:

	%
Cy	20
Ni	26
Cu	2
Mo	3
Si	2
Mn	0.75
C	0.08 max
Fe	bal

Units have steam-jacketed heads and water-cooled seals and bearing brackets. Of the 30 pumps of this type in the plant, 10 are used in the fatty acid service. These 10 operate at 3450 rpm. Plant is well satisfied with the performance of the pumps.

(Centrifugal pumps are product of The LaBour Company, Inc., Dept. CP, Elkhart, Ind. . . . or for more information check 3851 opposite last page.)



"Well, this unit doesn't really produce anything. We just have a by-product disposal problem and by running it through this unit we lose it all."

Thanks to E. L. Sutton, The Pure Oil Company, Nederland, Texas

For more information on product at left, specify 3852 . . . see information request blank opposite last page.

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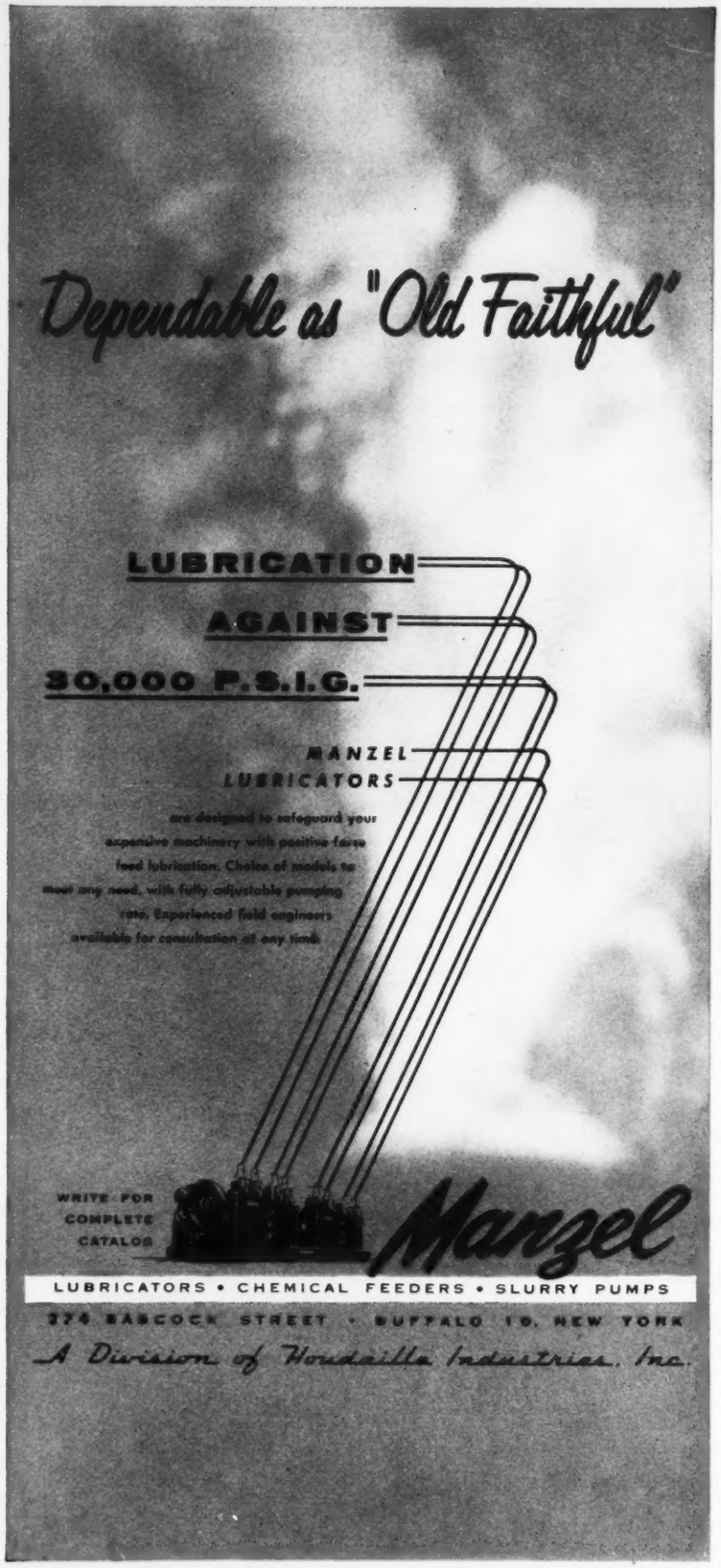
When inquiring check 3853 opposite last page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are designed to safeguard your expensive machinery with positive force feed lubrication. Choice of models to meet any need, with fully adjustable pumping rate. Experienced field engineers available for consultation at any time.
WRITE FOR COMPLETE CATALOG
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LUBRICATORS • CHEMICAL FEEDERS • SLURRY PUMPS
374 BABCOCK STREET • BUFFALO 10, NEW YORK
A Division of Houdaille Industries, Inc.

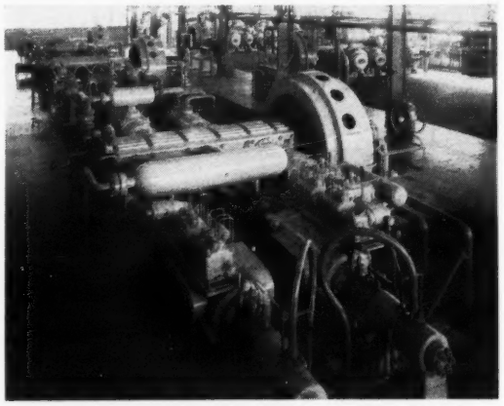
When inquiring check 3854 opposite last page

NEW SOLUTIONS of processing problems

Pressures up to 12,000 psi produced by compressors in Grace's NH_3 plant . . .

one unit can handle three different gases at the same time

An important role is played in the production of ammonia and urea at Grace Chemical Company, Memphis, Tenn., by the variety of compressors in service. A number of specialized types are used, some of which are shown in the photograph. All of these compressors have operated with a minimum of maintenance since plant went on stream two years ago. Plant produces 250 tons of anhydrous ammonia per day, a portion of which is converted into urea.



These compressors help Grace Chemical to produce 250 tons of anhydrous ammonia per day to convert 100 tons of it into 150 tons of urea

In accompanying photograph, each of the three machines in foreground is used to compress ammonia synthesis gas to a pressure between 8000 and 12,000 psi, depending on catalyst condition and cooling water temperature. Synthesis gas then goes to cascade units for conversion.

In line at rear of photograph are shown two of three compressors in use at Grace which — up to the time the installation was made — were the three most powerful reciprocating compressors that had been built. These 4000-hp units are also noteworthy because each one simultaneously handles three different gases under varying intake and discharge conditions. One gas is handled by each of the three sets of cylinders in the unit. Air is compressed from atmospheric pressure to 630 psi in four stages — nitrogen from 15.2 to 330 psi in three stages — and natural gas from 58.7 to 440 psi in two stages.

(Compressors are product of Ingersoll-Rand Co., Dept. CP, 11 Broadway, New York 4, N.Y. . . . or for more information check 3855 on form opposite last page.)

Mono
Stearates
Di

of
Diglycol
Ethylene Glycol
Diethylene Glycol
Polyethylene Glycol
Propylene Glycol
Polyoxyethylene
Butoxyethyl
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CHEMICAL MANUFACTURERS
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CHICAGO, ILL. • LOS ANGELES, CAL.

When inquiring check 3856 opposite last page

Stabilizing clear polyvinyl chloride plastic formulations against the effects of ultraviolet light has been a difficult thing to do. One year of outdoor exposure tests now shows that —

Clear PVC can be stabilized

CLEAR PVC RESIN FORMULA

	Parts
Polyvinyl chloride resin	100
Dioctyl phthalate	50
Ba-Cd laurate	2
Aryl phosphite	1
UV-9 stabilizer	(As noted)

Components were conventionally blended and hot-rolled, then molded into sheets in a 325°F press

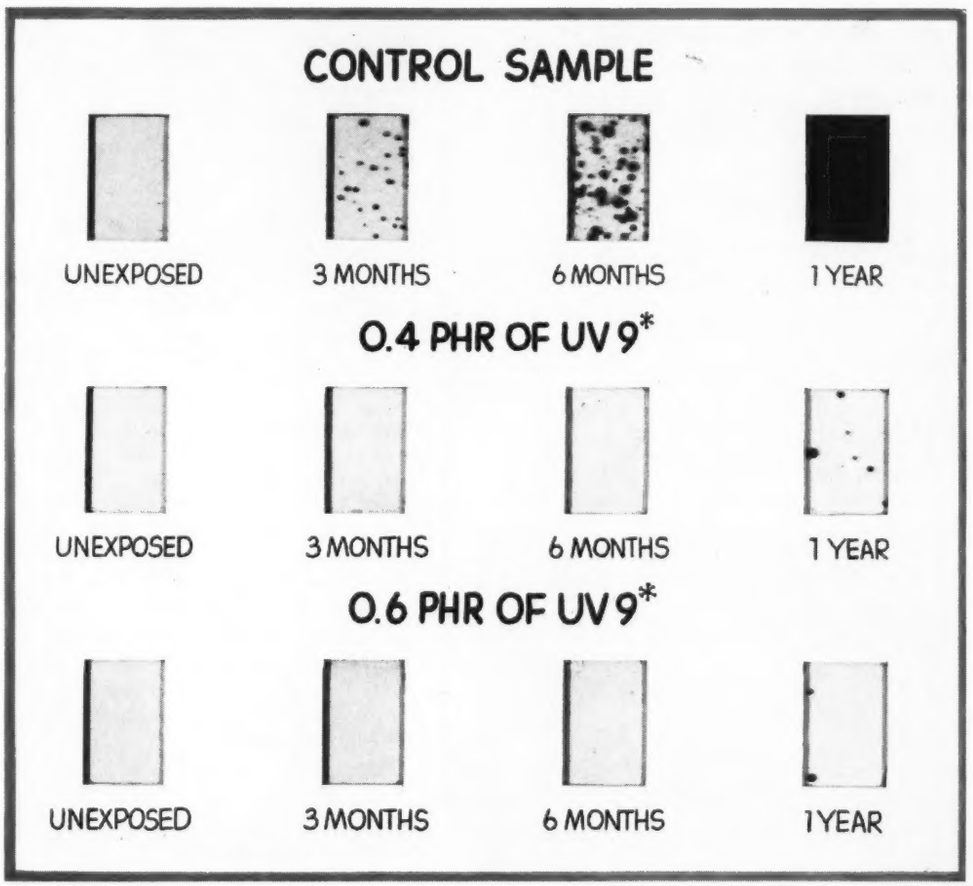


Fig 1 — Close-up of clear vinyl test panels that were exposed in Florida sunlight

Because unstabilized polyvinyl chloride resins are degraded by ultraviolet light, they find relatively little use in prolonged outdoor applications. Satisfactory stabilizers for opaque PVC compositions have been available for some time, but stabilizing clear vinyl compounds has been a lasting headache to formulators.

Accelerated aging tests showed a number of stabilizers that looked promising, but it took a year of outdoor exposure tests, like that shown in Fig 2, to prove which was best and to discover the optimum formulations.

Results are shown in Fig 1. A concentration of 0.4 to 0.6 phr of 2-hydroxy-4-methoxybenzophenone (called UV 9* Ultraviolet Absorber) used in the typical formulations shown in the table, gives markedly increased life.

The stabilizer is easily dispersed in the vinyl resins. and does not affect the clarity of the formulations. (*Trademark)

(UV 9 is a product of New Product Development Department, American Cyanamid Co., Dept. CP, 30 Rockefeller Plaza, New York 20, N.Y. . . . or for more information check 3857 on form opposite last page.)

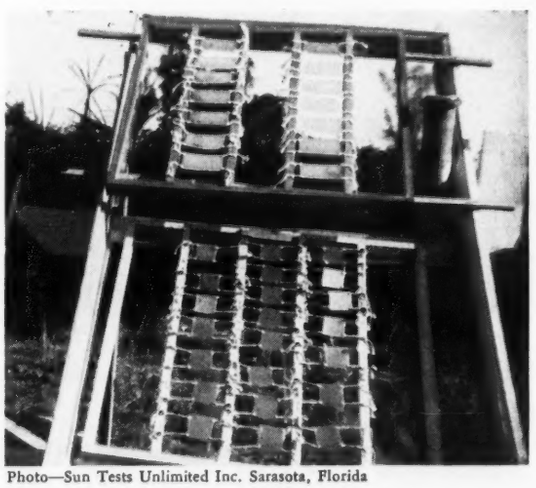


Fig 2 — One of the outdoor exposure test racks. Twelve months gave a total of 1496 ultraviolet sun hours

Photo—Sun Tests Unlimited Inc. Sarasota, Florida

Mathieson

POLYETHYLENE GLYCOLS are there

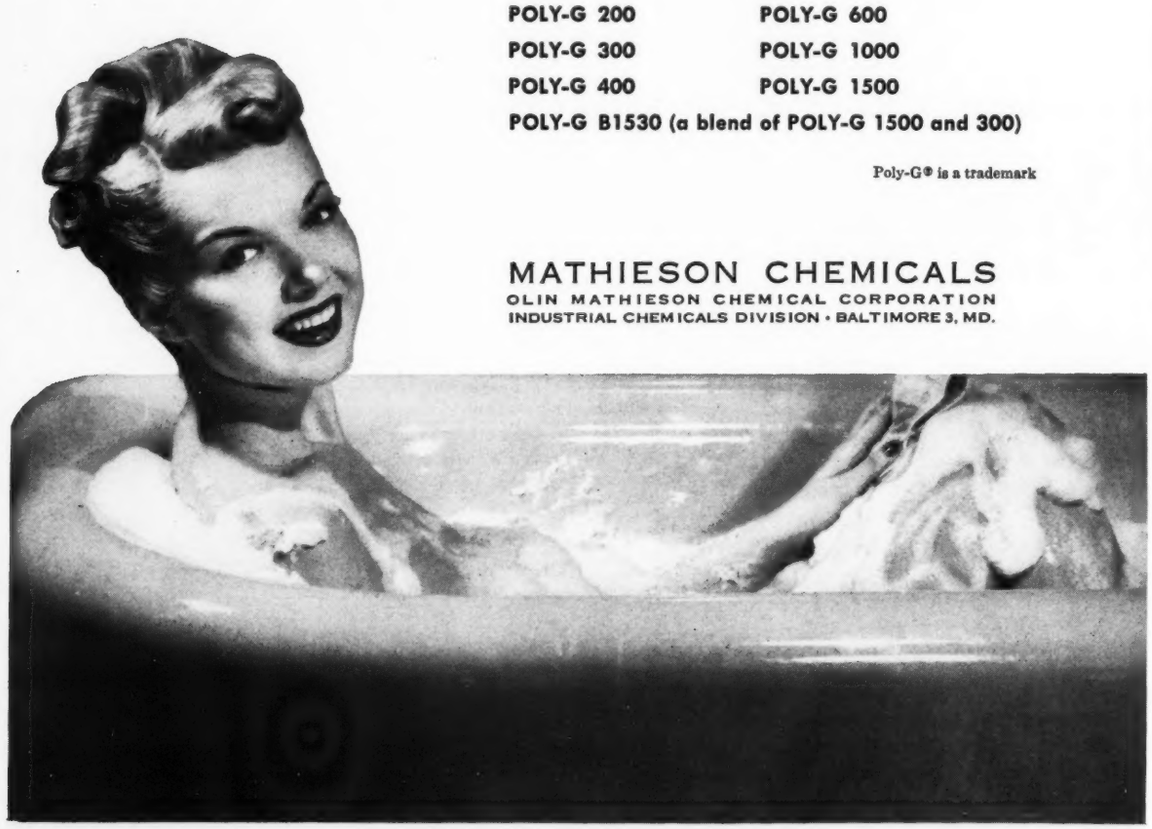
Dovetailing precisely with your most complex production schedules for soaps or surface active agents . . . meeting your most exacting requirements for consistent top quality . . . Mathieson polyethylene glycols are *there*. Poly-G's are shipped directly from the plant at Brandenburg, Kentucky, in Mathieson's fast-moving fleet of tank cars and tank trucks, and from local distributors' stocks in resin-lined drums.

And Mathieson technical assistance is there, too, whenever we can help you find new or more profitable applications for this versatile team of water soluble polyols. For further information or samples, call your Olin Mathieson representative or write today.

floods of suds

POLY-G 200 **POLY-G 600**
POLY-G 300 **POLY-G 1000**
POLY-G 400 **POLY-G 1500**
POLY-G B1530 (a blend of POLY-G 1500 and 300)

Poly-G® is a trademark



MATHIESON CHEMICALS
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4731

MATHIESON

INORGANICS: Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Potash • Caustic Soda • Chlorine • Hydrazine and Derivatives • Hypochlorite Products • Muriatic Acid • Nitrate of Soda • Nitric Acid • Soda Ash • Sodium Chlorite Products • Sulphate of Alumina • Sulphur (Processed) • Sulphuric Acid

ORGANICS: Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Glycol Ether Solvents • Ethylene Dichloride • Dichloroethylether • Formaldehyde • Methanol Sodium Methylate • Hexamine • Ethylene Diamine • Polyamines • Ethanolamines • Trichlorophenol • Surfactants

When inquiring check 3858 opposite last page

Develop strong, tough rubber said to combine qualities of silicone, organic . . .

does not "nerve up", can be milled and compounded after shelf-aging almost indefinitely

Uses: Material is suitable for molding, extruding, or calendering, and can be hot-air vulcanized. Suggested applications include oven door gaskets, aircraft door seals, wire and cable coatings, and oxygen masks.

Features: Product combines thermal stability and high dielectric properties of silicone rubber with mechanical strength and abrasion resistance of conventional organic rubber. It does not "nerve up", but can be milled and compounded after shelf-aging. It remains firm in the unvulcanized state, minimizing possible distortion of extruded shapes prior to curing.

Heat-stable silicone rubber has excellent tear and abrasion resistance

Description: Typical properties of silicone rubber include tensile strength in range of 1500 psi, tear strength of approximately 200 ppi, elongation of over 500%, and durometer from 50 to 60 on Shore A scale. Useful temperature range extends from −130° to over 500°F. Rubber shows excellent resistance to compression set, or permanent deformation under pressure, after prolonged exposure to elevated temperatures. It is non-toxic.

(Silastic 916 is available in pilot plant quantities from Dow Corning Corp., Dept. CP, Midland, Mich. . . . or for more information reader may simply check 3859 on form which is located opposite last page.)

Folder of data sheets on rare earth oxides

Set of 11 data sheets on company's rare earth oxides is contained in loose-leaf binder. Properties, suggested uses, and grade specifications are given.

Rare earth oxide data sheets are issued by Rare Earths and Thorium Division, Michigan Chemical Corp., Dept. CP, Saint Louis, Mich. When inquiring specify 3860 on form which is located opposite last page.

Light-colored organic monomer offered as duo-purpose building block . . .

GMA makes copolymers having any desired amount of functional groups

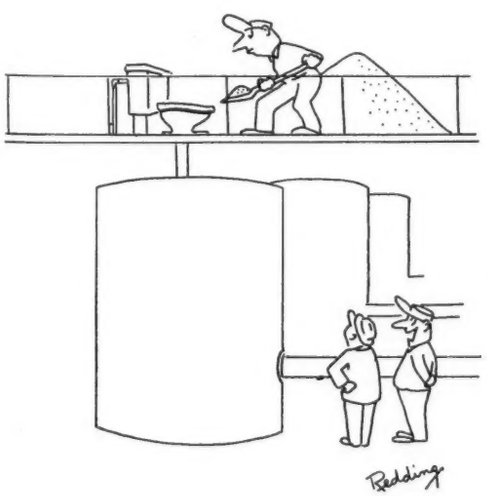
Uses: A monomer for use aiding dyeing, fine chemicals manufacture, leather, paint, paper, plastics, and rubber fields.

Features: GMA may be polymerized or copolymerized through its double bond and further reacted through the epoxide; or the oxirane ring may be first polymerized so as to leave vinyl group available for cross-linking.

Description: Glycidyl methacrylate (GMA) is a light-colored, almost odorless liquid. Manufacturing specs are:

Specific gravity (25°C)	1.073-0.005
Refractive index (25°C)	1.4482-0.0005
Viscosity (centistokes @ 25°C)	2.0-0.1
Color (Parlin Scale, max)	4
Chlorine content (%, max)	1
Epoxide content (%)	28.5-31.0

(CP-105 GMA is available in experimental and pilot plant quantities from Finishes Div., E.I. du Pont de Nemours & Co., Inc., Dept. CP, Wilmington 98, Del. . . . or for more information check 3861 on form opposite last page.)



"It looks funny, but it solves our batching problem."

Thanks to James V. Redding, The Central Pharmacal Company, Seymour, Ind.

NEW Piperazine Technical

Available in tank car quantities

Why all the excitement about this new CARBIDE product?

MANY REASONS . . .

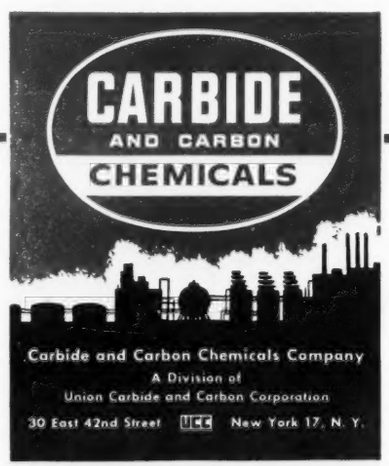
• Piperazine Technical, a 60 per cent piperazine—40 per cent water mixture is easy to handle. It melts at 35°C. *This is 73° less than anhydrous piperazine which melts at 108°C.* Piperazine Technical is handled readily as a liquid from drums stored in a heated room or from tank cars equipped with steam coils.

• Piperazine Technical simplifies manufacture of water solutions of piperazine salts used as anthelmintics. The water content lowers piperazine vapor pressure—reduces fumes. There is no dusting problem.

• High purity makes Piperazine Technical an excellent intermediate for tranquilizers, antihistamines, motion sickness and pinworm remedies.

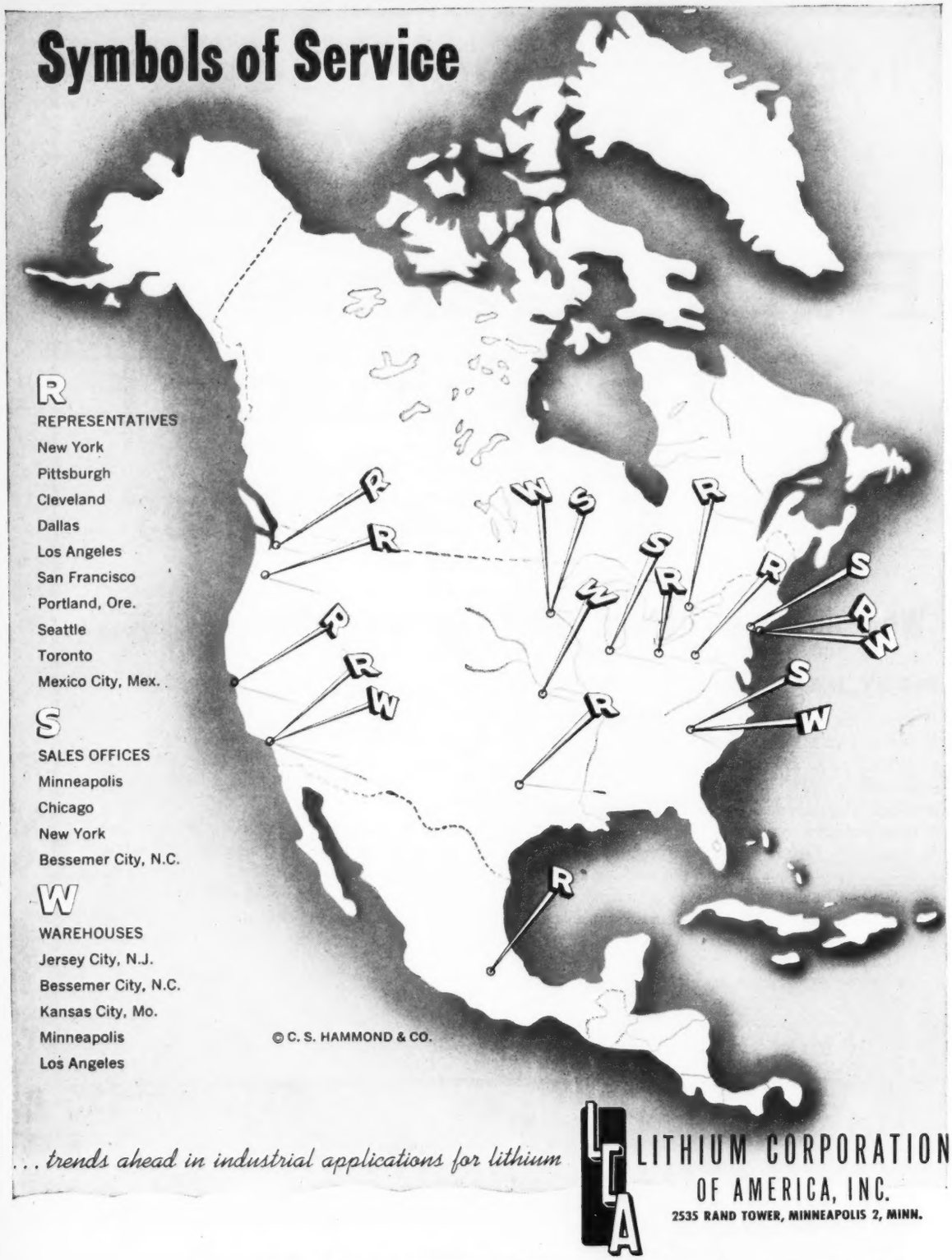
• Availability of Piperazine Technical also permits commercial development of condensation polymers useful as fibers, elastomers, detergents and textile specialties.

Now is the time to evaluate this CARBIDE product. A new bibliography on important uses and reactions of piperazine is available for you. For a copy of this bibliography and technical information, write Carbide and Carbon Chemicals Company, Department H, 30 East 42nd Street, Room 328, New York 17, New York.



In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.

When inquiring check 3862 opposite last page



. . . trends ahead in industrial applications for lithium

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RESEARCH LABORATORY: St. Louis Park, Minnesota

When inquiring check 3863 opposite last page

Effective insect repellent developed by USDA . . .

gives excellent protection from mosquitoes; wide variety of other pests

Developed by the USDA, diethyl toluamide, described as "the best all-purpose insect repellent so far-developed which can be applied directly to skin or clothing," provides protection against insects for up to eight hours. It is reported to be the most effective mosquito repellent developed thus far.

High concentrations of meta-isomer of diethyl toluamide (DET) is available to formulators of insect-repellent lotions and similar preparations. It is very resistant to "wipe off" and gives long protection.

(DET is available from R. W. Greeff & Co., Dept. CP, 10 Rockefeller Plaza, New York, N.Y., distributor for Montrose Chemical Co., Newark, N. J. . . . . or for more information reader may simply check 3864 on the convenient Reader Service slip opposite last page.)

Add to series of dyes for polyester fibers

Two dyes added to manufacturer's series of dyes for polyester fibers bring total number to 12. According to tests, dyes possess following characteristics:

Eastman Polyester Yellow RL produces economical, level shades of bright golden yellow on polyester fibers with good fastness to light, washing, and sublimation. Dye may be applied at boil with carrier or under pressure. Good union dyeings may be obtained in fabrics containing polyester and triacetate fibers, with selected carriers.

Eastman Polyester Dark Red FL, a maroon dye, is particularly suitable for economically dark wine, bordeaux, brown, and rubine shades on polyester fibers. In heavy shades it possesses outstanding fastness to washing, dry cleaning, perspiration, and sublimation, and good fastness to light. It may be applied at boil with carriers or under pressure. Although some carrying agents, such as phenyl phenols, affect its light fastness, this property can be restored by heat treatment following dyeing. Fabrics containing polyester and tri-acetate fibers can be union dyed by use of selected carriers.

(Eastman Polyester Yellow RL and Dark Red FL are products of Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Co., Dept. CP, 260 Madison Ave., New York 16, N.Y. . . . or for more information reader may simply check 3865 on the convenient Reader Service slip which is located opposite last page.)

Higher alkyl phenol should find uses as intermediate

Uses: As intermediate for non-ionic surface-active agents, lube oil additives, and other ethoxylated products. Compound can be the starting point for making many plasticizers and resins. Other uses include use as anti-oxidants and anti-skinning agents.

Features: This higher alkyl phenol is insoluble in water and dilute caustic solutions. It is soluble in most organics.

Description: Nonyl phenol is a mixture of mono alkyl phenols and is predominately para-substituted. A viscous, pale yellow liquid, it distills between 294-298°F (5-95%) and has a sp gr (@ 20°C) of 0.950. Hydroxyl value is 250-255, flash point (Toc) is 300°F, and refractive index (@ 20°C) is 1.513. It is made in commercial quantities at manufacturer's new plant in Millsdale, Illinois, along with a related compound, dinonyl phenol.

(Nonyl phenol is a product of The Stepan Chemical Co., Dept. CP, 20 N. Wacker Dr., Chicago 6, Ill. Check 3866 on form opposite last page.)

Flow of polyester compositions controlled by additive . . .

effectively inhibits crawling, sagging, draining, and pigment settling

Uses: Developed for controlling flow of polyester compositions.

Features: Additive is characterized by easy stir-in, with maximum results attained at temperatures from 90° to 110°F. As little as 0.2% gives a highly thixotropic body to polyesters. Compositions can be easily applied, yet do not drain or sag after application.

Description: Thixotropic agent, non-toxic, non-discoloring chemical derivative of castor oil, is supplied as finely-divided powder. Viscosity effects in polyesters are function of degree of concentration and stir-in temperature.

(Thixcin® E thixotropic agent is product of The Baker Castor Oil Co., Dept. CP, 120 Broadway, New York 5, N.Y. . . . or for more information check 3867 on form opposite last page.)

This month's Processing and Engineering Data section starts on page 216

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When inquiring check 3868 opposite last page

Now on Stream...

substantial new basic production of Cyclohexanol at Hopewell, Va.

under the brand name

National NAXOL* (CYCLOHEXANOL)

Here are the quick facts about a new major source of this important secondary alcohol:

National NAXOL is made in a modern streamlined plant by a highly-efficient direct catalytic process.

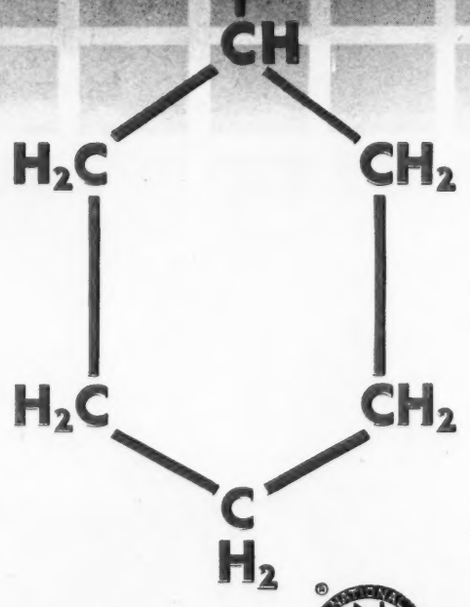
Our production is completely integrated right back to the basic raw materials within the Allied Chemical group.

Our output is substantial, completely competitive in every respect and can be quickly expanded to meet any foreseeable demand.

Two types immediately available: NAXOL (100% material) and NAXOL D (protected against freezing).

We invite inquiries from present and prospective users of either grade and will be pleased to send working samples, price quotations and delivery on C/L and LCL quantities.

*Trademark



NATIONAL ANILINE DIVISION ALLIED CHEMICAL & DYE CORPORATION

40 Rector St. New York 6, N. Y. • Akron Atlanta Boston Charlotte Chattanooga Chicago Columbus, Ga. Greensboro Los Angeles New Orleans Philadelphia Portland, Ore. Providence Richmond San Francisco Toronto

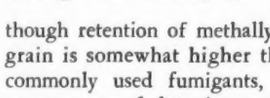
When inquiring check 3869 opposite last page

Low cost compound, methallyl chloride, makes useful intermediate in chemical syntheses . . .

low toxicity and ease of detection make this organic chloride a safe fumigant

Uses: Compound has application in resin and plastics field as well in organic synthesis. It has been extensively investigated as fumigant for stored grain and for soil.

Features: Methallyl chloride is potentially one of the cheapest organic chlorides available. Its



highly reactive chlorine and reactive double bond make it a useful intermediate in many chemical syntheses. Although retention of methallyl chloride by fumigated grain is somewhat higher than that of some other commonly used fumigants, its lower toxicity and greater ease of detection make it safer.

Description: Physical properties of typical commercial methallyl chloride are:

Purity (% min)	95.0
Color	Water white to straw
Specific gravity (20°/20°)	0.926-0.930
Distillation range (95% between, °C)	70-75
Free acid (%, max, as HCl)	0.10
Wt (lb/gal)	7.70-7.74

Compound possesses moderate toxicity, and adequate ventilation should be available when it is handled. Degree of toxicity is approximately same as that of allyl chloride.

(Methallyl chloride is available from Organic Chemicals Div., Food Machinery and Chemical Corp., Dept. CP, 161 E. 42nd St., New York 17, N.Y. . . . or for more information about manufacturer's product reader may simply check 3870 on form opposite last page.)

Savings in processing time with synthetic rubber in crumb form

Uses: Product is especially handy to manufacturers of cements, mastics, and adhesives.

Features: Since use of product will eliminate milling or chopping of bales into smaller pieces or pellets to go more easily into a solution, manufacturers will cut their processing times considerably.

Description: All hot types of company's Ameripol rubber are available in this crumb form.

(Ameripol rubber in crumb form is available from Goodrich-Gulf Chemicals, Inc., Dept. CP, 3121 Euclid Ave., Cleveland 15, Ohio . . . or for more information check 3871 on form which is located opposite last page.)

Versatile surface-active effective in hard, or soft water . . .

nonionic has good detergency, foaming, and solubilizing action

Uses: As surface-active agent for textile scouring, as dyeing and bleaching assistant, and for wool carbonizing; with paper for de-inking, felt washing, depitching, rewetting; with petroleum for oil well acidizing, secondary oil recovery, and drilling muds. It can also be used in household and industrial cleaners, cosmetics, metal cleaners and pickling compounds, and agricultural emulsions.

Features: Agent will not ionize in water or hydrolize in aqueous solutions of alkalis or acids. It can be used with anionic, cationic, or other nonionic agents. Effective in hard or soft water, it does not form salts with metallic ions. Agent gives good detergency, foaming, dispersing, emulsifying, and solubilizing action.

Description: Nonionic is nonyl phenoxy polyoxyethylene ethanol. The pale-yellow-to-colorless viscous liquid may be stored for indefinite periods of time. Properties are:

Cloud point (1% soln in water, °C)	52-56
pH (1% soln)	Neutral
Solidification point (°C)	4
Flash point (°C)	290
Density (lb/gal)	8.85
Specific gravity (25°C)	1.06

(Makon 10 is product of The Stepan Chemical Co., Dept. CP, 20 N. Wacker Dr., Chicago 6, Ill. . . . or for more information reader may simply check 3872 on form which is located opposite last page.)

Solvents for spectroanalysis have negligible impurities

Uses: Developed to reduce guesswork in chemicals required for modern spectrophotometry and analysis, as well as chromatography, special syntheses and extractions.

Features: Manufacturer guarantees that impurities are negligible for spectroanalytic purposes by giving not merely lot analysis of impurities by percent, but also the absorbence curve.

Description: Heptane and hexane reagents are available as spectrophotometrically-pure solvents, with each lot individually tested on automatic Beckman DK-2 Spectrophotometer.

(Heptane and hexane reagents are available from Fisher Scientific Co., Dept. CP, 303 Fisher Bldg., Pittsburgh 19, Pa. . . . or for more information reader may simply check 3873 on form located opposite last page.)

Eastman

ACIDS AND ANHYDRIDES

acetic acid
- Organic synthesis
- Reaction medium and solvent
- Dyeing assistant

acetic anhydride
- Acetylating agent
- Dehydrating agent in nitration and sulfonation reactions, etc.

propionic acid
- Ca or Na salt used as bread mold inhibitor
- Raw material for herbicides

n-butyric acid
- For the preparation of butyric esters useful in formulating perfumes and flavorings

n-butyric anhydride
- Acylating agent
- Intermediate

isobutyric acid
- As a starting point for the synthesis of plasticizers, perfume materials and lacquer solvents

isobutyric anhydride
- For the preparation of aromatic esters for perfumes

2-ethyl hexoic acid
- Pb, Mn and Co salts are used as oil paint driers
- Zn and Na salts are used as emulsifying and dispersing agents

Simplify the control of your processing operations with uniformly high quality Eastman acids and anhydrides. Known as the "standard of the industry," they are your assurance of a uniform product no matter when or in what quantities they are ordered. For more information, samples or specifications, write to Eastman Chemical Products, Inc., Chemicals Division, Kingsport, Tennessee.

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KINGSPORT, TENNESSEE, subsidiary of Eastman Kodak Company

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston.
West Coast: Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

When inquiring check 3874 opposite last page

"NOSEY" says:

ARE bad processing odors lowerin' the efficiency of your employees? And did you ever think that maybe you'd get more production and have a happier situation all around if such odors could be eliminated? It's been done, you know, many times! In fact, the firm I work for is dealing with problems like that — controlling, improving, eliminating bad odors — all the time. Why don't you write or give them a ring? FRITZSCHE will be happy to give you the benefit of their specialized experience. **That** I know!

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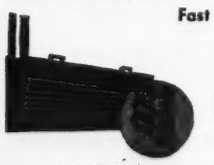
When inquiring check 3875 opposite last page

New Heat Transfer Sketch Book shows how to CUT COSTS all over the plant

Platecoil heat transfer units can be used in many ways, in many tanks, in many plants in many industries. The sketches shown above indicate some of the ways in which Platecoil has been used and can be used. They are featured in a new Platecoil bulletin that also contains many pictures, drawings and information on Platecoil installations and features. Send today for your free copy. Ask for Bulletin P-54.

Fast delivery from stock

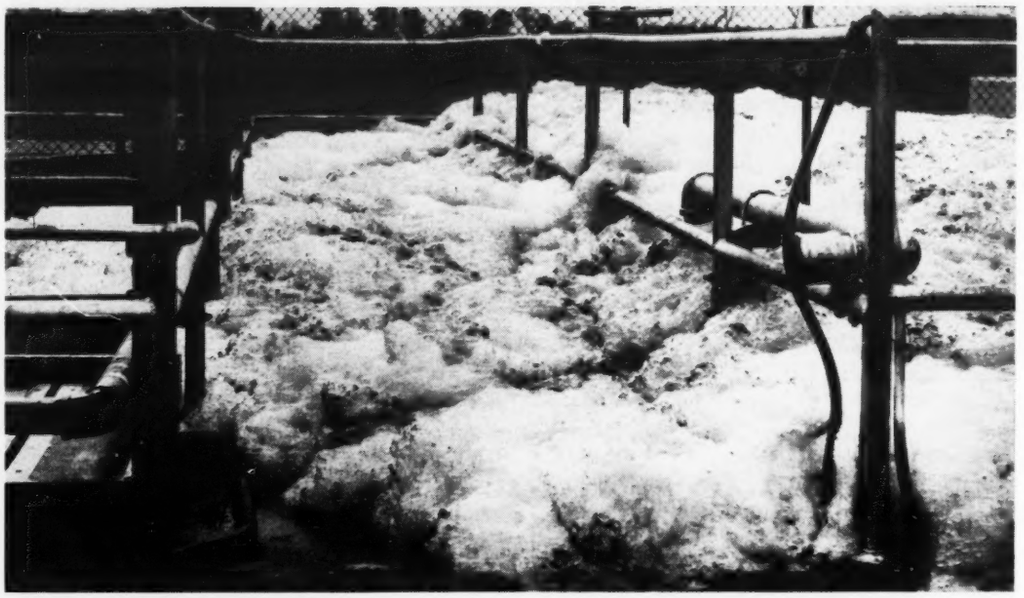


PLATECOIL by Trantor Mfg. inc. LANSING 4, MICHIGAN

You'll find our catalog in Sweet's Plant Engineering file

When inquiring check 3876 opposite last page

Eliminates foam-overs at Upjohn's



Top photograph is typical of the foam-over problem encountered at Upjohn's antibiotic waste reduction plant. Within two minutes of spraying the tank with S-118 antifoam, foam was broken, and lower photograph was taken

reduction plant for antibiotic wastes

Problem: Copious foam, sometimes six feet high, formed and spilled out of the aeration tanks at Upjohn Company's antibiotic waste reduction facilities in Kalamazoo, Michigan.

Each day, these facilities treat 100,000 gallons of spent beers from company's antibiotic producing units. This waste liquor produces a foam far more stable than that usually encountered in ordinary sewage treatment plants. The white froth inundated catwalks and blew into surrounding areas.

This could not be tolerated, but the foam was so stable that commercially available antifoams would not break it. To add insult to injury, the foam was slimy and slippery, and when it finally subsided, left a greasy, foul-smelling residue over everything it touched.

Frequent clean-ups were necessary, but still this did not *solve* the problem.

Solution: About a year ago, Upjohn contacted a manufacturer of antifoams to help solve this puzzler. He came up with a proprietary formulation based on fractionated vegetable oils. This agent is designed for use where much proteinaceous material is encountered, and it will not harm bacteria growth.

Last August, Upjohn started using the agent. They pump it into the effluent at twenty minute intervals. The mixture then flows through a pipe extending alongside the aeration tanks. Deflector nozzles, set in the pipe at uniformly spaced distances, cause this mixture to be finely sprayed over the tanks.

The antifoam, dark amber and stable over long periods in storage, is non-corrosive. It weighs 7.4 lb/gal, is free-flowing, and does not require heating or special handling, nor does it clog injector nozzles.

Results: Concentration in the aerators is maintained at ten ppm. This effectively prevents build-up of any foam.

Cost is about $1 a day. On a volume basis, this amounts to one cent per thousand gallons of waste that are processed. But even more important than the cost angle is that the foam-over problem has been eliminated.

(Antifoam S-118 is a product of Hodag Chemical Corp., Dept. CP, 7247 N. Central Park, Chicago 45, Ill. Check 3877 on form opposite last page.)

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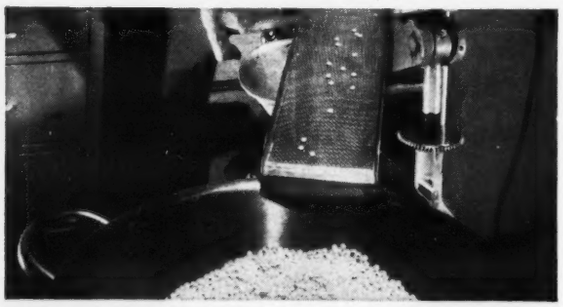
When inquiring check 3878 opposite last page

HOW *HERCULES* HELPS

GROW BETTER COTTON—Early season insect control with toxaphene insecticides helps farmers produce healthy bolls before the time of greatest infestation. Toxaphene has long been the keystone of complete control programs because it effectively and economically controls a large number of insect pests on a wide variety of crops. For example, toxaphene is officially recommended for control of more cotton insects than any other insecticide.



VITAMIN TABLETS—Purity is a must for such products as Abbott Laboratories multivitamin tablets. Hercules® cellulose gum serves as a disintegrator in these tablets; helps to quickly release the vitamins into the system. The exceptionally high purity of Hercules cellulose gum (99.5+%) and its uniform quality make it ideal for many medicinal preparations.

SELL FINE FURNITURE—Most furniture is naturally protected and beautified with fine lacquer for lasting beauty and durability. Hang tags like this are available at nominal cost through the many lacquer manufacturers who base their finishes on Hercules® nitrocellulose. These tags also tell how to take care of the lacquer finish.

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CHEMICAL MATERIALS FOR INDUSTRY

HERCULES

867-5

When inquiring check 3879 opposite last page

Good water resistance, stability, and compounding are combined in polyvinyl acetate emulsion

Uses: Emulsion is designed primarily as vehicle in exterior or interior water-base paints. It can also be used with adhesives, paper coatings, and textile finishes.

Features: Product combines good water resistance, with equally good stability and compounding properties.

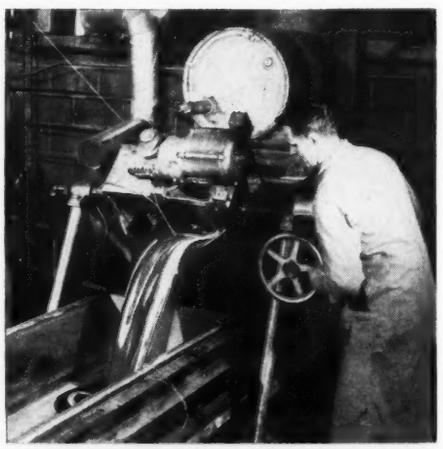
Description: Properties of polyvinyl acetate emulsion are as follows:

Type	Homopolymer
Solids (%)	54-56
Viscosity (poises)	9-13
Vinyl acetate content (% max)	1.0
pH	4-6
Water resistance	Excellent
Density (lb/gal)	9.2
Mechanical stability	Good
Heat sealing temp (°C)	75-85
Compounding characteristics	Good
Particle size (μ)	1-3

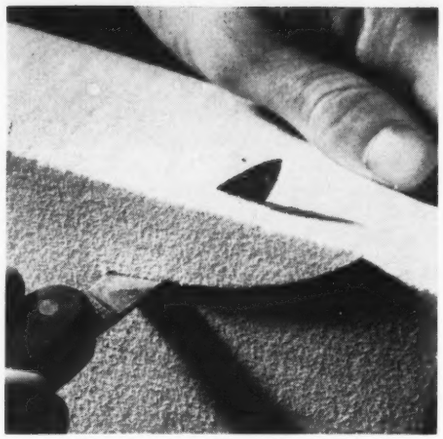
(Elvacet 84-1100 is product of Electrochemicals Dept., E.I. du Pont de Nemours and Co., Inc., Dept. CP, Wilmington 98, Delaware . . . . or for more information reader may simply check 3880 on the convenient Reader Service slip which is located opposite last page.)

Prefoamed epoxy resin blocks have good properties . . .

can be carved with knife, or machined, to shape and size desired



Foamed blocks are made by pouring an epoxy resin formulation into a mold. Blocks as large as 1x2x6 ft are available in densities of 5, 10, 15, and 20 lb/cu ft. Final rigid foam is a thermoset, is unaffected by solvents.



Foams may be carved or machined with great ease. The structure is fine and uniform. Blocks have excellent dimensional stability, are free from warping and excessive dimension change at moderately elevated temp and high humidities.

(DuRafoam is made by Pilot Plants, Inc., Dept. CP, Hazardville, Conn. . . . or for more information check 3881 on form opposite last page.)

(Epon epoxy resins are product of Shell Chemical Corp., Dept. CP, 50 W. 50th St., New York 20, N.Y. . . . or for more information check 3882 on form opposite last page.)

"I don't believe this was included in our fringe benefits, was it?"

Thanks to F. J. Slawek, Wyeth Laboratories, Inc., West Chester, Pa.

today's super-durable rubber **OFFERS TRIPLE VALUE**

Performance! Versatility! Economy! In all three, Enjay Butyl is the world's outstanding rubber value. In laboratory tests, and in a wide variety of applications, Enjay Butyl has demonstrated its tremendous resistance to weather, sunlight, moisture, tear, impact, chipping and cracking . . . properties that set Enjay Butyl-made products apart as outstanding performers.

Children's wading pools, hot materials conveyor belts, garden hose . . . in these, and many other rubber products, Enjay Butyl out-performs and outlasts *all other* types of rubber, synthetic *or* natural. *Low-in-cost* and *immediately available* in regular and non-staining grades for white and colored applications, this truly wonder rubber may well be able to cut costs and improve performance in *your* product. For further information, and for expert technical assistance, contact the Enjay Company.

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Enjay Butyl is the greatest rubber value in the world . . . the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

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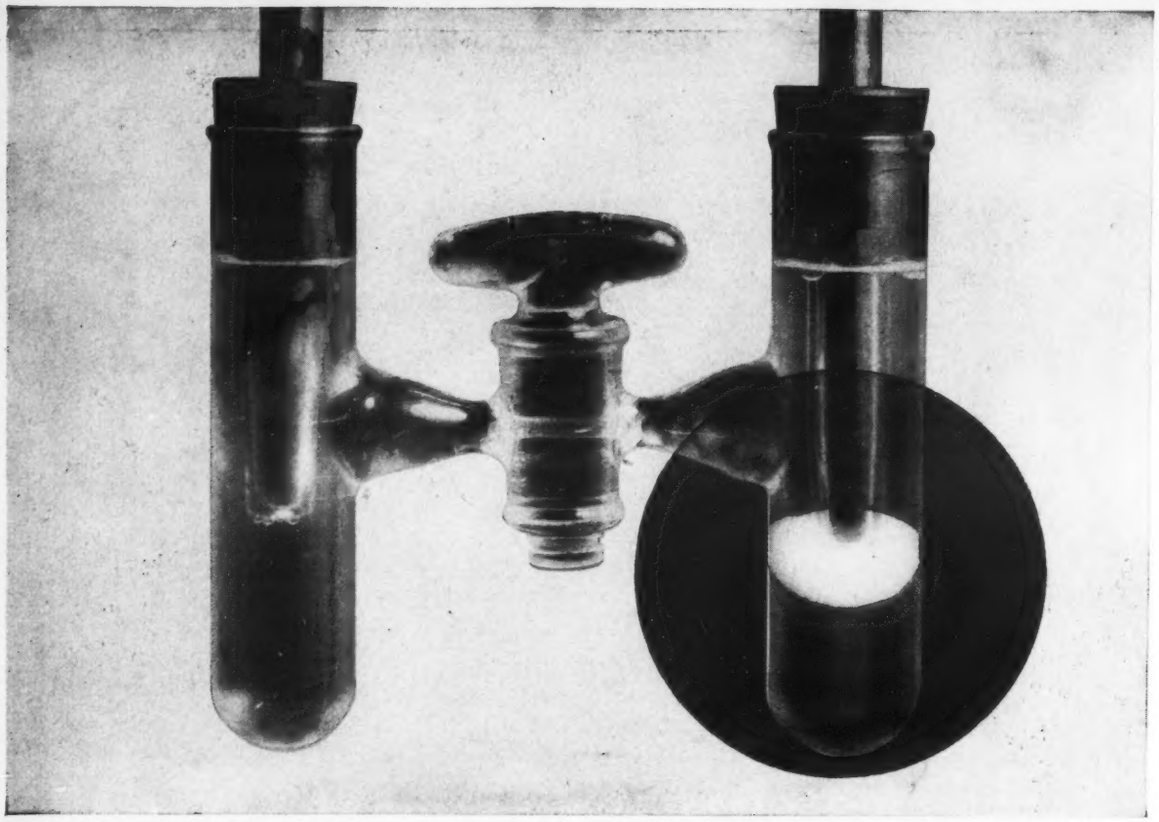

This is an unretouched photograph.

NEW! A CATIONIC STARCH

An entirely new concept is shown in the above electrophoresis cell. The cloudy mass about the cathode is National's CATO®—industry's first cationic starch.

CATO carries a cationic charge as an integral part of its polymeric structure. The result? A strong affinity for negatively charged surfaces—as proved by CATO's migration under applied potential to the cathode of the electrophoresis cell.

CATO has other unusual starch properties, including greater clarity and increased stability. All of which suggest uses as a:

• size • binder • flocculent
• stabilizer • thickening agent

CATO may well answer some special need in your product or process. Write if you'd like to know more, telling us something of the use you have in mind.

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CHEMICAL PROGRESS WEEK-APRIL 8-12

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When inquiring check 3884 opposite last page

Offers dinonyl phthalate and nonyl alcohol commercially

Nonyl alcohol is now commercially available. Its uniformity and low color (< 10 APHA) results in excellent reaction characteristics with dibasic acids, with little color developing during esterification. Principal use should be in making plasticizers.

Dinonyl phthalate, the reaction product of nonyl alcohol and phthalic anhydride, possesses several advantages over DOP, such as greater retention in vinyl formulations, superior electrical properties, and economy. Tests show that vinyl formulations of equal modulus of elasticity require about 14% more dinonyl phthalate than do formulations based on DOP. Since the vinyl polymer is more costly, appreciable savings are possible when more plasticizer is used.

The development is the result of an expansion in manufacturer's oxo facilities. It is the forerunner of several derivatives of higher aliphatic aldehydes which are expected to be introduced in the near future.

(Nonyl alcohol and dinonyl phthalate are products of Eastman Chemical Products, Inc., sub. of Eastman Kodak Co., Dept. CP, 260 Madison Ave., New York 16, N.Y. . . . or for more information reader may simply check 3885 on form opposite last page.)

Commercial levulinic acid usable in wide variety of chemical reactions

Uses: Product has potential as an inexpensive chemical intermediate for large number of synthetic organic chemical products, including synthetic resins and solvents.

Features: Acid undergoes variety of chemical reactions. In some instances it reacts as carboxylic acid, and in others as a ketone. The 1,4 stereochemical relationship of its functional groups frequently results in cyclization reactions, forming heterocyclic compounds. Acid undergoes condensation reactions involving its reactive methylene groups.

Description: Levulinic acid is produced by treating cellulosic material remaining after extraction of furfural from corncobs. Compound is formed when this raw material is treated with strong acids at high temperature. Many cellulosic raw materials can be used.

(Levulinic acid is product of The Quaker Oats Company, Dept CP, Merchandise Mart Plaza, Chicago 54, Ill. . . . or for more information check 3886 on form opposite last page.)

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CHEMICAL WORKS

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When inquiring check 3887 opposite last page

Kills destructive nematodes without harming plants . . .

has powerful, lasting residual effect

Uses: For protecting trees and ornamentals against nematodes.

Features: Chemical is reported to kill destructive nematodes without harming plants. It has powerful, lasting residual effect.

Description: Organic phosphate compound (O-2,4-dichlorophenyl O,O-diethyl phosphorothioate) is relatively non-phytotoxic, residual nematocide of low volatility. It is an emulsifiable concentrate which mixes easily with water, forming milky-like suspension.

Distribution through soil is by water movement or by mechanical means in order to obtain maximum dispersion. Treating soil two weeks prior to planting or seeding will give best results. Chemical should not be used on plants with products for human or animal consumption.

(V-C 13 Nemacide is product of Virginia-Carolina Chemical Corp., Dept. CP, 401 E. Main St., Richmond, Va. . . . or for more information reader may simply check 3888 on the convenient Reader Service slip which is located opposite last page.)

Lists chemicals, facilities

Hundreds of industrial chemicals produced by company are listed alphabetically in 24-page booklet. Illustrations show plant and laboratory facilities for development and production. Brief background on company and its policies is included.

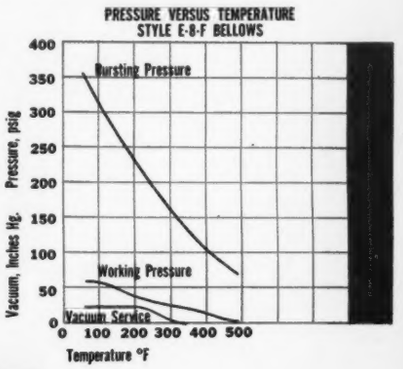
"Industrial Chemicals" is issued by The Harshaw Chemical Co., Dept. CP, 1945 E. 97th St., Cleveland 6, Ohio. When inquiring reader may simply check 3889 on the convenient Reader Service slip located opposite last page.

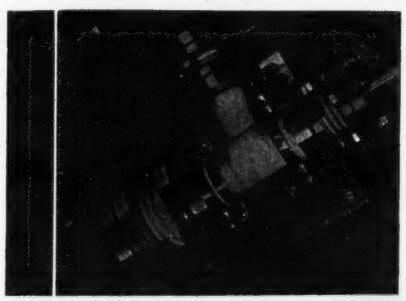
DORÉ INTRODUCES NEW QUALITY CONTROL CHECKS AND CHARTS TO ASSURE

OPTIMUM SAFETY AND PERFORMANCE

OF BELLOWS and FLEXIBLE COUPLINGS OF TEFLON* — EXPANSION JOINTS WITH TEFLON LINING

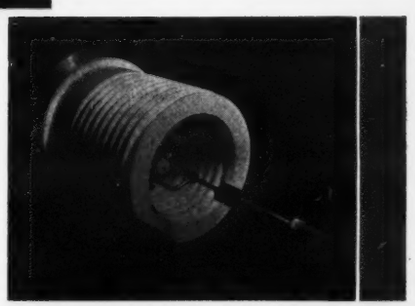
1. ***For the first time in the industry*** **pressure-temperature charts showing recommended operating pressures and actual burst pressures are furnished with each Doré Bellows and Flexible Coupling of Teflon, and Expansion Joint lined with Teflon. This confirms our pretesting — takes the guesswork out of operating conditions.**





2. ***For the first time in the industry*** **each Doré Bellows and Flexible Coupling of Teflon, and Expansion Joint lined with Teflon, is cycled with cold water at pressures 50% greater than recommended operating pressures prior to shipment.**

3. ***For the first time in the industry*** **Doré's Bellows and Flexible Coupling of Teflon, and Expansion Joint lined with Teflon are gauged for uniform wall thickness of each convolution at time of manufacture. This eliminates variation of wall thickness — the major cause of bellows rupture.**



***DuPont's tetrafluoroethylene resin**

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When inquiring check 3890 opposite last page

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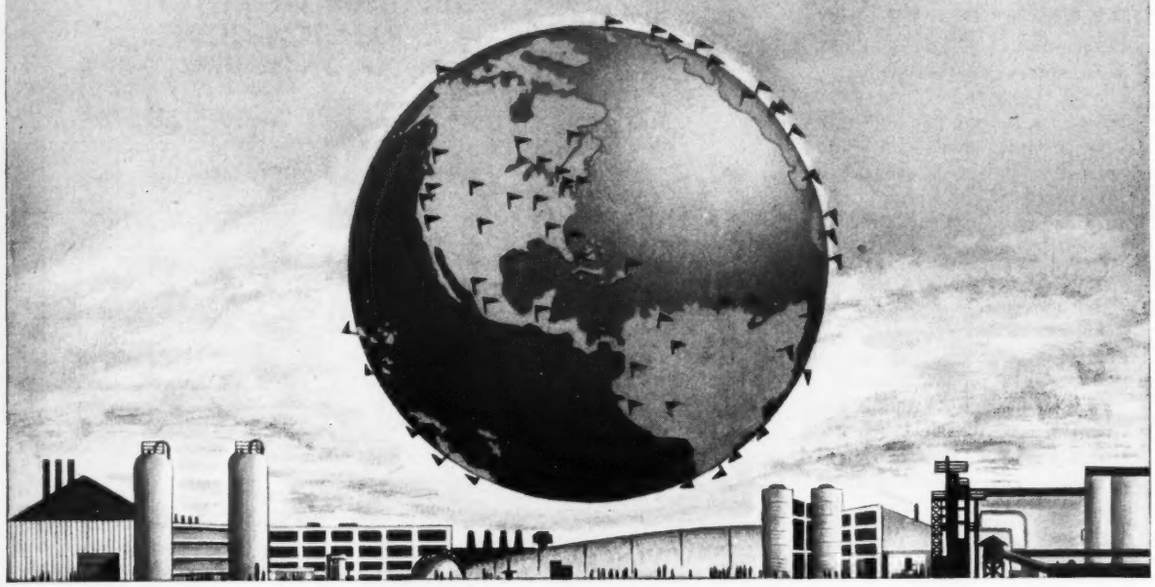

HARSHAW sells chemicals —thousands of them— for these and many other industries throughout the world

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Enamel
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Feed Stuff, Mineral Feed
Fertilizer
Food
Glass
Insecticide and Fungicide
Laundry
Leather
Lithographing
Linoleum and Floor Covering
Lubricant
Match
Metallurgical
Metal Working
Oil Cloth
Optical
Paint, Varnish and Lacquer
Paper
Petroleum
Pharmaceutical
Photographic
Porcelain Enamel
Plastics
Pottery
Printing Ink
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Refractories
Rubber
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Soaps
Textile
Veterinary Remedies
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Here are typical Harshaw chemical products

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Driers and Metal Soaps
Vinyl Stabilizers
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Fluorides
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Chemical Commodities

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FREE! This 16-page booklet lists the many chemicals available from Harshaw.
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When inquiring check 3891 opposite last page

Process converts lignin, a plentiful by-product, into polyester fiber

Low-cost material for textile uses foreseen when fiber-making process is perfected

Uses: Polyester fibers made from lignin may have a promising future in textile manufacturing.

Features: A process for converting lignin into a polyester fiber has recently been discovered by Dr. Louis Bock and James Anderson. Lignin is a one billion pound-a-year, little-utilized by-product of paper pulp and cellulose manufacturing. If the fiber can be perfected, the textile industry will have another continuous and easily replenishable source of low-cost raw material, although at the present state of development, fiber is not economically feasible.

Experimental fibers have a tensile strength as high as 4.4 gram/denier, which is about in the range of present commercial polyester fibers, such as Dacron. The experimental fibers melt around 400°F, have good dyeing properties and low water absorption.

James K. Anderson and Dr. Louis H. Bock (standing) developed process for making polyester fiber from lignin at company's Olympic Research Division, Shelton, Washington

Description: Lignin is found in waste liquors from chemical cellulose and paper pulp production. The lignin is converted to vanillin and this in turn is made into protocatechuic acid, also known as dihydroxybenzoic acid. The acid's hydroxy groups are etherified with epichlorohydrin,

and compound is then polymerized by heating under vacuum. Fiber is formed when polymer is forced through an orifice. Stretching the fiber increases its tenacity.

The discoverers have not yet named the new polyesters. They admit that there are still some "termites" (a wood industry term for what's commonly known as "bugs") to be worked out of the process, but they are quick to compare the present stage of development to that of nylon in the mid-1930's.

The company has no interest in producing the fiber, but may consider marketing the protocatechuic acid.

(Additional information may be obtained from Rayonier Inc., Dept. CP, 161 E. 42nd St., New York 17, N.Y. Check 3892 opposite last page.)

Announce production of lecithin in plastic, liquid forms

Manufacturer announces commercial production and distribution of lecithin formerly marketed through other producers. Three grades of plastic lecithin (natural, bleached, and double bleached) and three similar grades of liquid form are available.

(Kelecin is product of Spencer Kellogg and Sons, Inc., Dept. CP, 100 Delaware Ave., Buffalo 5, N.Y. Check 3892A opposite last page.)

Low durometer silicone rubber combines high moldability with high compressibility

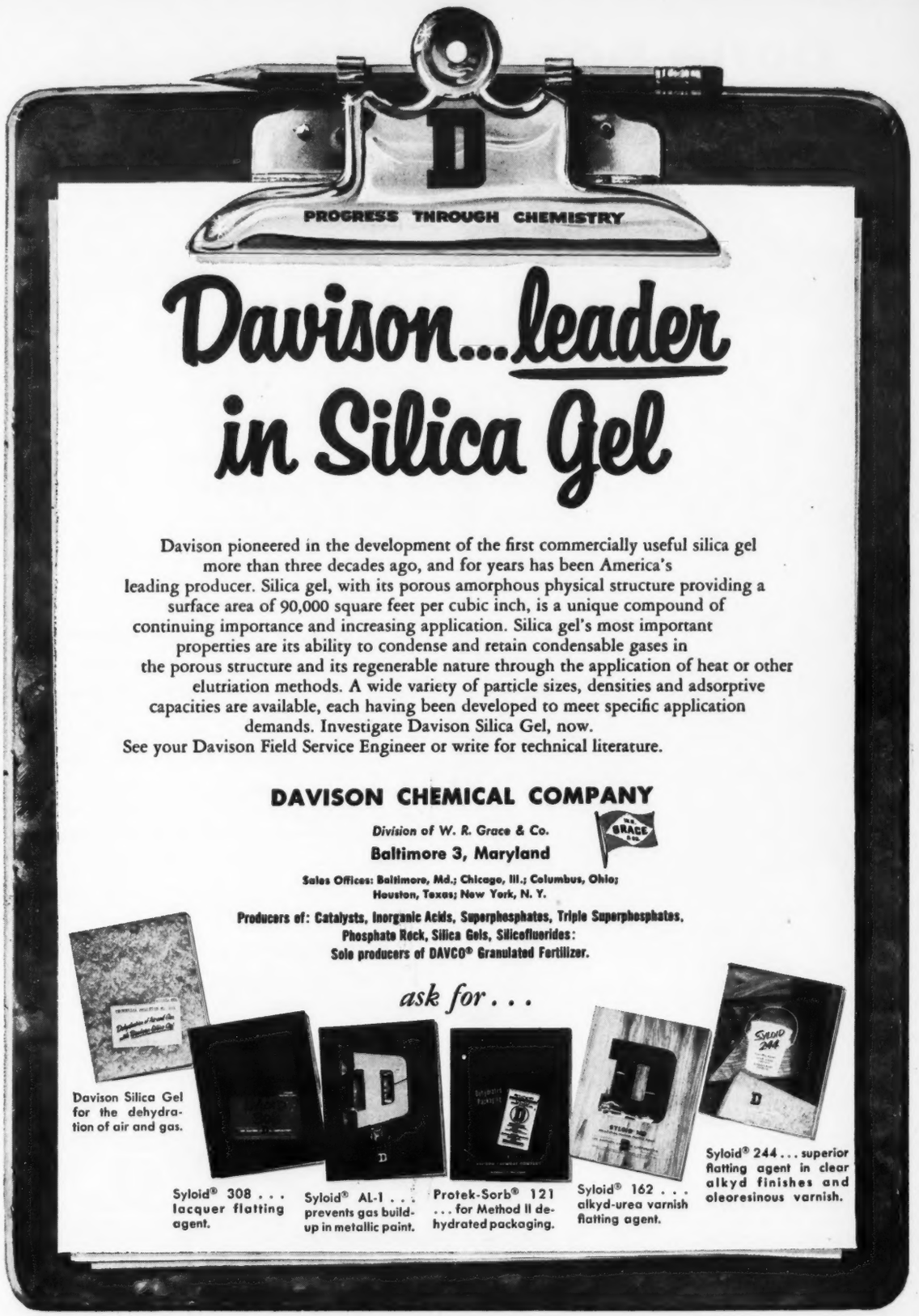
Uses: Compound is recommended where soft sealing material is desired in thick or thin section, in simple or complicated shapes.

Features: Compound combines compressibility of silicone sponge rubber with moldability.

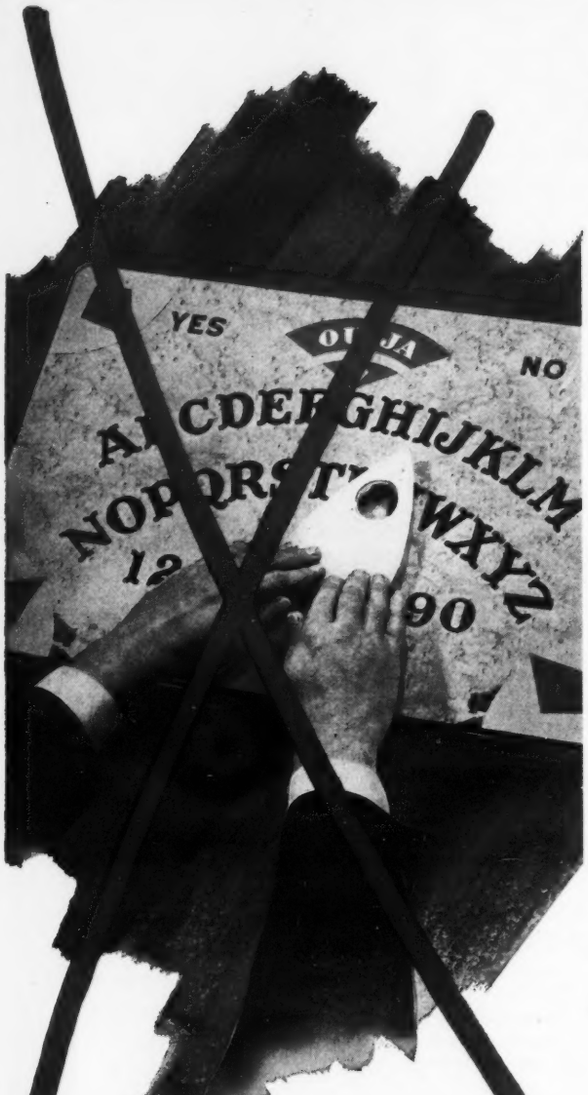
Description: Low durometer silicone rubber has −100° to 500°F temperature range. It is immune to ozone and weathering, and is odorless, tasteless, non-corrosive, and non-contaminating. Typical properties include:

Hardness (durometer "A")	27
Tensile strength (psi)	718
Elongation (%)	450
Tear (lb/in)	31.5
Dry heat resistance (24 hr @ 450° F Hardness change, duro "A")	/2
Compression set (% of original deflection 22 hr @ 350° F, compressed to 60% of original thickness)	29

(COHRlastic R-11568 is available from The Connecticut Hard Rubber Co., Dept. CP, 407 East St., New Haven 9, Conn. . . . or for more information check 3893 on form opposite last page.)


D
PROGRESS THROUGH CHEMISTRY
Davison...leader in Silica Gel
Davison pioneered in the development of the first commercially useful silica gel more than three decades ago, and for years has been America's leading producer. Silica gel, with its porous amorphous physical structure providing a surface area of 90,000 square feet per cubic inch, is a unique compound of continuing importance and increasing application. Silica gel's most important properties are its ability to condense and retain condensable gases in the porous structure and its regenerable nature through the application of heat or other elutriation methods. A wide variety of particle sizes, densities and adsorptive capacities are available, each having been developed to meet specific application demands. Investigate Davison Silica Gel, now.
See your Davison Field Service Engineer or write for technical literature.
DAVISON CHEMICAL COMPANY
Division of W. R. Grace & Co.
Baltimore 3, Maryland
Sales Offices: Baltimore, Md.; Chicago, Ill.; Columbus, Ohio; Houston, Texas; New York, N. Y.
Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels, Silicofluorides:
Sole producers of DAVCO® Granulated Fertilizer.
ask for . . .
Davison Silica Gel for the dehydration of air and gas.
Syloid® 308 . . . lacquer flatting agent.
Syloid® AL-1 . . . prevents gas build-up in metallic paint.
Protek-Sorb® 121 . . . for Method II dehydrated packaging.
Syloid® 162 . . . alkyd-urea varnish flatting agent.
Syloid® 244 . . . superior flatting agent in clear alkyd finishes and oleoresinous varnish.
When inquiring check 3894 opposite last page

Ouija boards are passé



Time was, when a person had a question, out would come the ouija board for an answer. This wasn't too accurate a system, of course . . . but a lot of people put a lot of faith in what the ouija board told them.

Times change — and today accuracy is the keyword. That's why the modern business publication wants its circulation audited.

In joining BPA* CHEMICAL PROCESSING has taken an important step toward sound and accurate planning in your behalf. It means that we are checking, double-checking and constantly rechecking —

- **Who you are**
- **Where you work**
- **What your job is**

The Publisher wants and needs this information — and the BPA* audit can assure both him and his advertisers that he is getting his magazine into the hands of people *qualified by their common interests* to receive it. It helps him to give you —

- **Editorials that will *help you in your work***
- **Advertising that will *have value to you***

He can serve you even better if you will complete surveys and questionnaires which he may send you, and if you will give him your thoughts and opinions on the editorials and advertisements in his magazine.

You, the reader, are the *key person* to the publisher — and the BPA* audit helps him in his never-ending effort to think about you and design his magazine for you.

You, the reader, benefit when the circulation of CHEMICAL PROCESSING is audited by . . .

***BUSINESS PUBLICATIONS AUDIT OF CIRCULATION, INC.**
420 Lexington Avenue New York 17, N. Y.

BPA

A Non-Profit, Tripartite Membership Corporation of Advertisers, Advertising Agencies and Business Publications

Tough acetal resin resists solvents, abrasion

Uses: For injection molding and extrusion, blow molding, or machining into aerosol bottles, gears, pipe, bearings, and wire coating.

Features: Properties of material include toughness, wide temperature range, good solvent and abrasion resistance, low permeability, and dimensional stability.

Description: Acetal resin is linear polyacetal which can be represented by formula $(-CH_2O-)_n$. Typical figures from ASTM standard tests are:

	"Delrin" 500X	"Delrin" 150X
Elongation (%) −68°F	13	38
158°F	330	460
Impact strength (Izod @ −40°F)	1.2	1.8
Tensile strength (psi @ −68°F)	14,700	
Flexural modulus (psi @ 73°F)	410,000	
Shear strength (psi)	9,510	
Heat distortion temp (°F @ 66 psi)	338	
Water absorption (24 hr immersion, %)	0.4	
Specific gravity	1.425	
Melting point (crystalline, °F)	347	
Deformation under load (2000 psi @ 122°F, %)	0.5	
Compressive stress @ 1% deformation (psi)	5200	
Coefficient of linear thermal expansion (per °F)	4.5×10^{-5}	
Tabor abrasion (1000 gm load, CS-17 wheel, mg/1000 cycles)	20	

(Delrin acetal resin is product of Polychemicals Dept. E.I. du Pont de Nemours & Co., Inc., Dept. CP, Wilmington 98, Del. . . . or for more information check 3895 on form opposite last page.)

Two commercial grades of potassium silicate

Two commercial grades of potassium silicate have these physical and chemical properties:

	No. 28	No. 40
Weight percent K_2O	7.8	12.6
Weight percent SiO_2	19.2	26.4
Viscosity (centipoises)	40	114
Weight (lb/gal)	10.34	11.5

No. 28 is recommended as an adhesive and binder for welding rod coatings, special cements, and other coatings. No. 40, more alkaline than No. 28, is also recommended as an adhesive and binder for welding rod coatings as well as for certain detergent uses, such as builder for potash soaps and rapid-sudsing soaps, and liquid synthetic detergents.

(No. 28 and No. 40 grades of potassium silicate are available from Cowles Chemical Co., Dept CP, 7016 Euclid Ave., Cleveland 3, Ohio . . . or check 3896 on form opposite last page.)

Two effective agents found to protect rubber products from ozone damage . . .

meet specifications of US Army Ordnance Dept. for all rubber products

Uses: Designed to retard deterioration and cracking of rubber products.

Features: Retardants meet specifications of US Army Ordnance Dept. which call for dynamic protection to ozone exposure under conditions of continuous stressing and relaxing of the rubber.

Description: Antiozonants are designated Tenamene 30 (N,N'-di-2-octyl-*p*-phenylenediamine) and Tenamene 31 (N,N'-di-3-(5-methyl heptyl)-*p*-phenylenediamine). Both antiozonants tend to accelerate the cure, with Tenamene 30 having slightly greater effect. By reducing amount of accelerator slightly or adding small amount of retarder, compounder can obtain satisfactory scorching time.

Research has firmly established that ozone, rather than sunlight, is the principal cause of rubber deterioration. Ozone attacks internal chemical bonds of unsaturated elastomers resulting in destructive checking or cracking.

(Antiozonants are products of Eastman Chemical Products, Inc., Dept. CP, Kingsport, Tenn. Check 3897 on form opposite last page.)

Economical dust elimination with aqueous dispersion . . .

calcium stearate paste permits applications not possible with powdered form

Uses: For production of machine coated papers, manufacture of stucco and cement paints, as well as other water paints, and in many other industries where presence of water is required in operations.

Features: Paste can be applied uniformly, eliminating waste. It prevents dust, inconvenience, fire and health problems which may result when using powdered form. Readily dilutable to any concentrate, product permits better dispersions of other dry additives in great many applications.

Description: Aquacal is 45% aqueous dispersion of calcium stearate having the following specifications:

Appearance	White Paste
Odor	Neutral
pH	8.5-9.0
Solids	45%
Weight/gal	7.4 lb

(Aquacal is product of Beacon Chemical Industries, Inc., Dept. CP, 33-51 Richdale Ave., Cambridge 40, Mass. . . . or for more information check 3898 on form opposite last page.)

BRIEFS for buyers of

Sodium Sulfides
Alkyl Acid Phosphates
Caustic Soda
Caustic Potash

Sulfide economics: A different molecule might save you money

If you're using sodium sulfide as a source of sulfur, you can get the sulfur for about 5 cents a pound less.

Just switch to Hooker *sodium sulfhydrate.*

1. Compared with sodium sulfide, sodium sulfhydrate has 62.6% more sulfur. In 100 lbs. of Na_2S there are about 60 lbs. of anhydrous Na_2S.

   $(60 \times \frac{32}{78} = 24.6$ lbs. of sulfur)

   But in 100 lbs. of flake NaSH there are about 70 lbs. of anhydrous NaSH.

   $(70 \times \frac{32}{56} = 40$ lbs. of sulfur)

2. Therefore the sulfur in sodium sulfhydrate costs less than the sulfur in sodium sulfide. Sulfur in Na_2S (at prevailing prices) costs about $.224 a pound.

   Sulfur in NaSH costs about $.169 a pound.

3. And because Hooker sodium sulfhydrate contains less water of crystallization, it costs less in freight charges.

Your Hooker salesman will be glad to review these figures with your specific requirements in mind. A talk with him might achieve lower-cost sulfidity in your processing.

Clip the coupon for technical data.

$(RO)_2 P(O) OH + ROP (O) (OH)_2$ You can get quick delivery on six of these phosphates

With the experience our OLDBURY® Products people have had with phosphorus (since 1896), it was only natural that they be among the first to develop these alkyl acid phosphates for commercial use.

So far we are preparing six in regular production quantities: methyl, n-propyl, n-butyl, amyl, 2-ethyl hexyl, lauryl, and stearyl.

All are exceptionally light in color. They are strong acids but generally decompose at temperatures above 100° C.

Among the many uses our customers have put them to, the following are typical:

Catalysts in resin curing.

Stabilizers for vinyl plastics and peroxides.

Oil additives.

Antioxidants in fats.

Pigment dispersing agents.

Rust-preventive coatings.

Lubricants and anti-static agents for synthetic fibers.

Emulsifying agents and detergents.

Degreasing and wetting agents for metals.

If you'd like further information on these compounds, check the coupon, or write us direct.

CAUSTIC SODA
CAUSTIC POTASH
Save time, streamline purchasing

Do you use both these alkalis?

You can save time, cut paper work with *one* order, *one* billing, *one* responsibility, by ordering both from Hooker.

To keep your file current on forms, strengths, and specifications of liquid and dry NIALK® caustic potash, send the coupon for new data sheets we've just completed. NIALK caustic potash is available in these forms:

Liquid: 45% to 52%, tank cars and drums.
Flake and solid: 85% and 90%.
Special 90% forms: granular, broken, crushed, powder, and walnut.

You can get these forms of Hooker caustic soda:

Liquid: 50% and 73%, tank cars; 50% in tank wagons, drums, barges.
Flake: regular, fine, crystal, granular.
Solid

For more information on items mentioned here, check below:

- ☐ Sodium Sulfhydrate
- ☐ Sodium Sulfide
- ☐ OLDBURY® Alkyl Acid Phosphates
- ☐ Caustic Soda
- ☐ Caustic Potash

For information on these other Hooker chemicals, check below:

- ☐ NIALK® Carbonate of Potash
- ☐ Monochlorobenzene
- ☐ *para*-Dichlorobenzene
- ☐ *ortho*-Dichlorobenzene
- ☐ Trichlorobenzene
- ☐ 1,2,4,5-Tetrachlorobenzene

Clip and mail to us with your name, title, and company address. When requesting samples, please use business letterhead to speed delivery.

HOOKER CHEMICALS PLASTICS

HOOKER ELECTROCHEMICAL COMPANY
506 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

When inquiring check 3899 opposite last page

thumbnail portrait

of the first filteraid to give really satisfactory

performance in strong alkaline solutions

GLC Nerofil

A processed carbon-base filteraid...the first complete-new type of filteraid developed in the past 20 years.

Characteristics—Physically and chemically stable. Practically unaffected even by boiling caustic. 30 minute test in 50% sodium hydroxide at 125°F. showed no silicon solubility.

Performance—Clarity of filtrate excellent. Flowrates comparable to those obtained with many grades of diatomite filteraids, due to low density and high porosity of the Nerofil filter cake.

Special Advantages—Filter cake is combustible, an advantage in metals values recovery. Nerofil does not have the high temperature breakdown of cellulosic filteraids, nor the silicon solubility of diatomite.

History of Use—After pilot tests, Nerofil has been adopted by, and is being used by, firms engaged in caustic production, sulfur production, textile mercerizing, metal plating, metallurgical work, the filtration of lignosulfonate liquors and other 'difficult' solutions.

The Nerofil Bulletin provides more complete information. Just fill out the coupon for your copy.

NEROFIL DEPARTMENT,
Great Lakes Carbon Corporation
612 So. Flower St., Los Angeles 17, Calif.

Name_____

Position_____

Company_____

City_____ Zone____ State_____

When inquiring check 3900 opposite last page

Many new applications found for agricultural fungicide

Uses: Provides protection against mold and mildew. A highly purified form can be used in dandruff removing preparations.

Features: Product is non-volatile and will not wash away. It can be handled without special equipment and safety precautions.

Description: Originally developed by Esso Research and Engineering Co. for agricultural applications, Vancide 89 (N-trichloromethylthio tetrahydrophthalimide), has found many non-farm uses. When added to paint in quantity of 1% (wt) gives full protection against mold or mildew. Vinyl film and tape "seasoned" with this chemical also becomes mold resistant and won't stiffen at low temp.

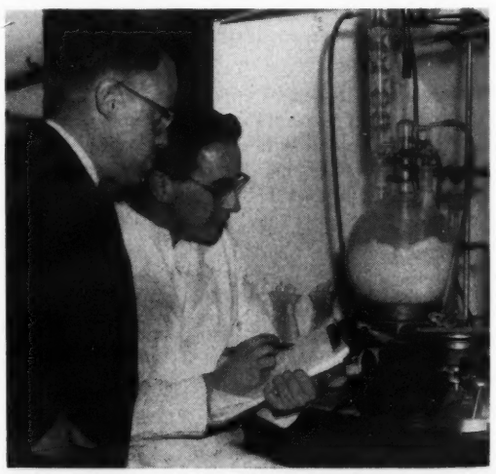
(Vancide 89 is sold by R. T. Vanderbilt Co., Inc., Dept. CP, 230 Park Ave., New York 17, N.Y. Check 3901 on form opposite last page.)

Tests of new plastic indicate it can replace metals in many applications

Resin combines toughness, impact strength, heat resistance, dimensional stability

Uses: Molding compound is expected to replace cast metals, ceramics, and other plastics in many applications.

Features: Resin offers combination of toughness, impact strength, heat resistance and dimen-



Dr. L. S. Moody, Pittsfield laboratory manager, and Allan G. Hlavac, laboratory assistant, participate in development of new Lexan polycarbonate resin

sional stability. Early studies indicate it can be made in variety of transparent or opaque colors. Characteristics make it suitable for use as electrical insulating material.

Description: Polycarbonate resin is being made in small lots for company's testing program. It is being evaluated in form of molding compound, extrusion compound film, varnish, and coating. Properties suggest its use in such applications as coil forms, appliance parts, gears, automotive and structural parts, handles, drawer rollers, and electronic components. Properties of polycarbonate resin molding compound are shown below. (Unless otherwise indicated, values were determined at room temp.)

Impact strength (notched Izod, ft lb/in)	12-16
Tensile yield strength (psi)	8000-9000
Tensile ultimate strength (psi)	9000-10,500
Elongation (%)	60-100
Flexural strength (psi)	11-13,000
Water absorption (24 hr immersion, %)	0.3
Indentation hardness (Rockwell)	M70
Specific gravity	1.20
Dielectric strength (short time, vpm 1/8" thickness)	400
Dielectric constant (60 cycles)	2.80
Power factor (60 cycles)	0.009
Heat distortion temp (264 psi, °F)	280-290
Mold shrinkage (in/in)	0.005-0.007
Melting point (crystalline °F)	514
Flammability	self-extinguishing

(Lexan polycarbonate resin is being developed by Chemical Development Dept., General Electric Co., Dept. CP, One Plastics Ave., Pittsfield, Mass. Check 3902 on form opposite last page.)

". . . Gangway, oops, sorry, gangway, hot stuff, oops, sorry . . ."

SOLVAY quality CAUSTIC POTASH

in types, forms and packages to fit your requirements

TECHNICAL GRADE

SOLVAY Technical Caustic Potash is the quality standard grade product that has been recognized by users as a leader in quality and dependability for over three decades. It is produced in both liquid and dry forms.

The dry product is produced in flake, small flake, walnut and solid forms, all of which are unusually low in iron, light in color and produce solutions of exceptional clarity. It is available in steel drums as follows:

Flake, 90-92%	350 lbs. net 100 lbs. net	(12-, 18-inch caps and full open head)
Small Flake, 90-92%	400 lbs. net 100 lbs. net	(12-, 18-inch caps and full open head)
Walnut, 90-92%	200 lbs. net 100 lbs. net	
Solid, 90-92%	675 lbs. net 100 lbs. net	

SOLVAY Technical Caustic Potash in liquid form is available in 45% strength in both returnable and non-returnable 55-gallon steel drums, 660 lbs. net, and in 45-52% strength in specially-lined tank cars of 4,000, 6,000, 8,000 and 10,000 gallons capacity.

MERCURY CELL GRADE

SOLVAY is the pioneer producer of this super-quality grade of commercial caustic potash. This material, which set a new standard for the industry for whiteness and purity, contains only trace quantities of metals and chloride, and is chlorate-free. It is available in both flake and liquid forms in the following packages:

Flake, 90-92%	Steel drums—350 lbs. net (15-inch cap and full open head) 100 lbs. net
Liquor, 45%	Returnable 55-gal.—660 lbs. net Non-returnable 55-gal.—660 lbs. net
Liquor, 45-52%	Specially-lined tank cars—4,000, 6,000, 8,000 and 10,000 gallons

Mail coupon for complete data, sample!

SOLVAY

Aluminum Chloride • Vinyl Chloride • Sodium Nitrite
Calcium Chloride • Potassium Carbonate • Soda Ash
Caustic Potash • Snowflake® Crystals • Caustic Soda
Sodium Bicarbonate • Ammonium Chloride • Chlorine
Methylene Chloride • Hydrogen Peroxide • Chloroform
Ammonium Bicarbonate • Monochlorobenzene • Cleaning Compounds • Ortho-dichlorobenzene • Para-dichlorobenzene
Methyl Chloride • Carbon Tetrachloride

Allied Chemical

SOLVAY PROCESS DIVISION
ALLIED CHEMICAL & DYE CORPORATION
61 Broadway, New York 6, N. Y.

Please send me without cost:

Samples of Technical Grade Caustic Potash
☐ Flake ☐ Small Flake ☐ Solid ☐ Walnut
☐ Liquid, 45% strength ☐ Liquid, 49-50% strength

Samples of Mercury Cell Caustic Potash
☐ Flake ☐ Liquid

Caustic Potash fact book ☐

Name_____

Position_____

Company_____

Phone_____

Address_____

City_____ Zone_____ State_____ DS-6

When inquiring check 3903 opposite last page

ANNOUNCING

THE **1957**

GLYCERINE RESEARCH AWARDS

FIRST AWARD $1,000
SECOND AWARD 300
THIRD AWARD 200

These annual awards were established in 1952 to recognize research leading to new and improved applications of glycerine and glycerine derivatives. Award winning work may deal with the chemical, physical or physiological properties of these materials; with actual or projected uses; or with scientific principles likely to stimulate future applications. Originality in extending the usefulness of glycerine into new fields will receive special consideration.

BASIS OF ENTRY

These awards are open to any individual in the United States or Canada engaged in research, either in industry or with government or educational institutions. Entries by research teams of two or three associates are eligible. Persons connected with member companies of the Glycerine Division, Association of American Soap & Glycerine Producers, Inc., or laboratories which they employ are not eligible.

First consideration will be given to work which has come to a clear-cut point of accomplishment during the current year; but work carried on in previous years, the significance of which has been confirmed by commercial application in 1957, also will be eligible.

Entries will be judged by a committee of three persons of outstanding reputation and scientific background, having no connection with the Association or its members.

METHOD OF NOMINATION

Nominations must be made on the official entry blank, which may be obtained by writing to: Awards Committee, Glycerine Producers' Association, 295 Madison Avenue, New York 17, N. Y.

All nominations for the 1957 awards must be received by November 1, 1957 to be eligible.

Honor Role of Glycerine Research Award Winners

1952

First Dr. Ivan W. Brown, Jr.
Duke University School of Medicine and
Rev. Basile J. Luyet
Institute of Biophysics, St. Louis University

Second Dr. Raymond Reiser and Dr. Hermann Schlenk
Texas Agricultural Experiment Station

Third Research team at Southern Regional Research Laboratory headed by Dr. Reuben O. Feuge

1953

First Dr. Erich Baer
University of Toronto

Second Dr. Lewis I. Gidez
Brookhaven National Laboratory and
Dr. Manfred L. Karnovsky
Harvard Medical School

Third Albert C. Nuessle
Rohm & Haas and
Russell F. Crawford, Jr.
Sharon Hill, Pa.

1954

First Prof. Robert K. Summerbell
Northwestern University and
Dr. James R. Stephens
American Cyanamid Co.

Second Two research teams:
Dr. Robert W. Swick and Akira Kakao
of Argonne National Laboratory and
Dr. Harland G. Wood and Dr. Per Schambye
of Western Reserve University

Third Dr. Henry A. Sloviter
University of Pennsylvania

1955

First Dr. Reed A. Gray
Merck & Co.

Second Dr. Eugene P. Kennedy
University of Chicago

Third Dr. Karl H. Lauer
University of Alabama

1956

First Dr. Herbert J. Dutton
U. S. Dept. of Agriculture

Second Dr. Donald Zilversmit
University of Tennessee

Third Dr. Stanley G. Knight
University of Wisconsin

When inquiring check 3904 opposite last page

Foam plastic formula offers longer life, cost saving . . .

price per lb from 24 to 34c less

Uses: For application in manufacture of flexible and rigid polyurethane foam plastics for wide variety of product uses.

Features: Field tests indicate that polyethers lower manufacturing cost for products embodying foam plastics, and improve product life. Polyethers cost from 24 to 34c per lb less than polyesters being used.

Description: Polyurethane grades of polyethers are made up of specially selected members of manufacturer's series of nonionic surface-active agents. Under test conditions of 70°C and 95% relative humidity for seven days, established by Society of Plastics Industry, physical properties of polyether-based polyurethanes show no significant change. Foams based on polyesters show impaired physical properties as result of these tests.

(Pluronic and Tetronic polyethers are products of Wyandotte Chemical Corp., Dept. CP, Wyandotte, Mich. Check 3905 on form opp. last page.)

Thermosetting textile resins for stiffening and hand

Three thermosetting textile resins have been added to company's line of products.

Hartoresin S-50 is high-solids, stabilized urea-formaldehyde resin syrup for stiffening nylon net materials and bodying cottons. It has higher storage and bath life than unstabilized urea resin syrups.

Hartoset F-60 is modified urea-formaldehyde resin for stiffening and flame-retardant finishes on nylon laces, nets, and shoe-cloth. It gives excellent stiff finishes without increasing flammability of fabric.

Softolene A is synthetic wax emulsion which softens resin formulations for cotton stabilization. It gives an excellent hand and an improved tear-strength of resin-treated cotton.

(Resins are products of Hart Products Corp., Dept. CP, 1440 Broadway, New York, N.Y. . . . or for more information check 3906 on form opposite last page.)

Your guide . . . to more chemical materials and equipment is the alphabetical product directory beginning on page 237

Organo-aluminum compounds: catalysts, fuels, intermediates . . .

trimethyl aluminum and methyl aluminum sesquichloride in pilot-scale amounts

Trimethyl aluminum has possible applications as polymerization catalysts for plastics and as an intermediate for chemical synthesis. Compound is also being tested as a fuel and ignitor for ram-jet and turbo-jet engines.

A sodium-based process is used for making this chemical. Cost estimates, based on the pilot operations, indicate that trimethyl can be produced commercially for $2-5/lb, although price in pilot quantities is much higher.

Methyl aluminum sesquichloride, a mixture of methyl aluminum dichloride, CH_3AlCl_2, and dimethyl aluminum chloride, $(CH_3)_2AlCl$, may also find use as a catalyst and a chemical intermediate. Product is also in the pilot stage.

(Trimethyl aluminum and methyl aluminum sesquichloride are products of U. S. Industrial Chemical Co., Div. of National Distillers Products Corp., Dept. CP, 99 Park Ave., New York 16, N. Y. . . . or for more information reader may simply check 3907 on form which is located opposite last page.)

Acrylic monomers polymerized with ultraviolet light . . .

copolymers appear to be analogous to proteins in their behavior in aqueous solution

Uses: Suggested applications are: mordant for fixing soluble dyes in photographic film, anchoring agent, antistatic agent for synthetic fibers, lubricating oil additive, ion exchange resins, and for improving adhesion between rubber and nylon or rayon tire cord.

Features: Water- and solvent-soluble monomer may be polymerized with an azo-type catalyst or by irradiation with ultra-violet light. Copolymers are "polyampholytes" and are of particular interest because they appear to be analogous to proteins in their behavior in aqueous solution. They combine with both acids and bases.

Description: Acrylic monomer, dimethylaminoethyl methacrylate, has 0.25% N,N'-diphenyl-*p*-phenylene diamine as an inhibitor. It is available in pilot-plant quantities. Copolymers have molecular weights in 270,000 to 330,000 range.

(Acrylic monomer is product of Rohm & Haas Co., Dept. CP, Washington Square, Philadelphia 5, Pa. . . . or for more information reader may simply check 3908 on form which is located opposite last page.)

Dowicide preservatives prevent product breakdown

. . . protect quality in canned products

In tests on two emulsion liquid floor wax samples stored for two weeks at 98°F., one sample remained pure, liquid and uniform. The other became putrid, viscous, discolored and completely unusable, due to bacterial action.

The two samples were identical except for one important difference: the one *not* affected by bacteria had been treated with a Dowicide® preservative. The dual job of protecting quality and prolonging the effective life of canned products through control of bacteria and fungi is an important one. And it's one that Dowicide preservatives do extremely well.

If your product is anything short of perfection, one of fourteen Dowicide preservatives may possibly improve it. Let our laboratories help you choose the right one. For specific information, return the coupon to us. THE DOW CHEMICAL COMPANY, Midland, Michigan.

THE DOW CHEMICAL COMPANY,
Dept. DP 401C, Midland, Michigan

Please send me further information on the uses of Dowicide preservatives for:

NAME_____ TITLE_____ ☐ paint ☐ pulp and paper ☐ ceramics

FIRM_____ ADDRESS_____ ☐ adhesives ☐ cutting oils ☐ petroleum

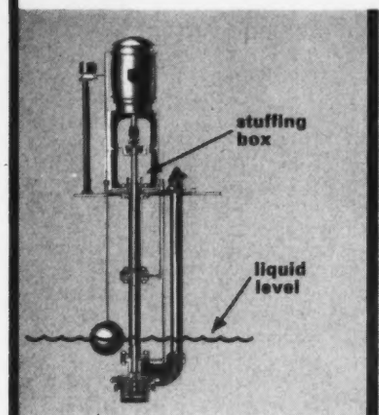
CITY_____ STATE_____ ☐ building materials ☐ other (specify)_____

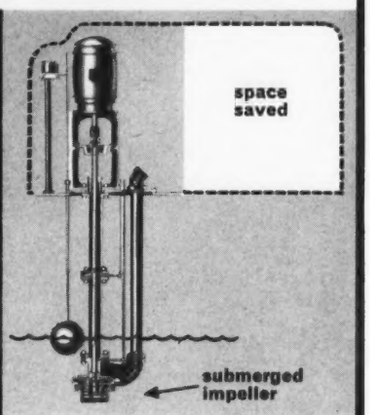
YOU CAN DEPEND ON DOW

When inquiring check 3909 opposite last page

you stop leakage, save space, and cut costs with Yeomans

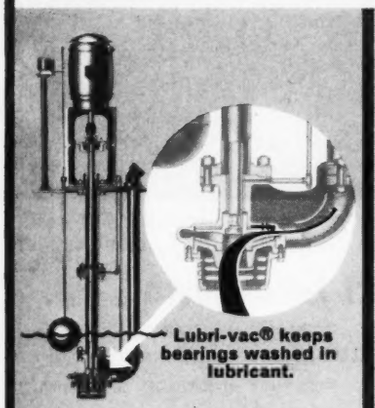
VERTICAL WET PIT PUMPS





ELIMINATE LEAKAGE. Stuffing boxes and seals are not under liquid pressure. With the Yeomans Vertical Wet Pit Pump there are no costly, annoying, or dangerous liquid leaks, as with horizontal pumps.

SAVE FLOOR SPACE. They use less than half the space required by horizontal pumps. Also, no priming equipment is needed as with suction lift horizontals. Impellers are submerged in the liquid ready for service.



CUT MAINTENANCE COSTS. With exclusive Lubri-vac® bearings are kept free of abrasive matter. Lubricant pressure prevents fluids from working into bearings. Result: Bearing failures are 90% less than with conventional vertical wet pit pumps.

SPECIAL DESIGNS. 59 Years of experience has enabled Yeomans to develop many excellent special designs for pumping "problem materials." All pumps can be furnished with ferrous and nonferrous alloy parts as required. *Capacity range from 5 to 10,000 g.p.m.*

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Manufacturers of: pumps for drainage • sewage • condensation return • water supply and circulation • equipment for treatment of domestic and industrial wastes.

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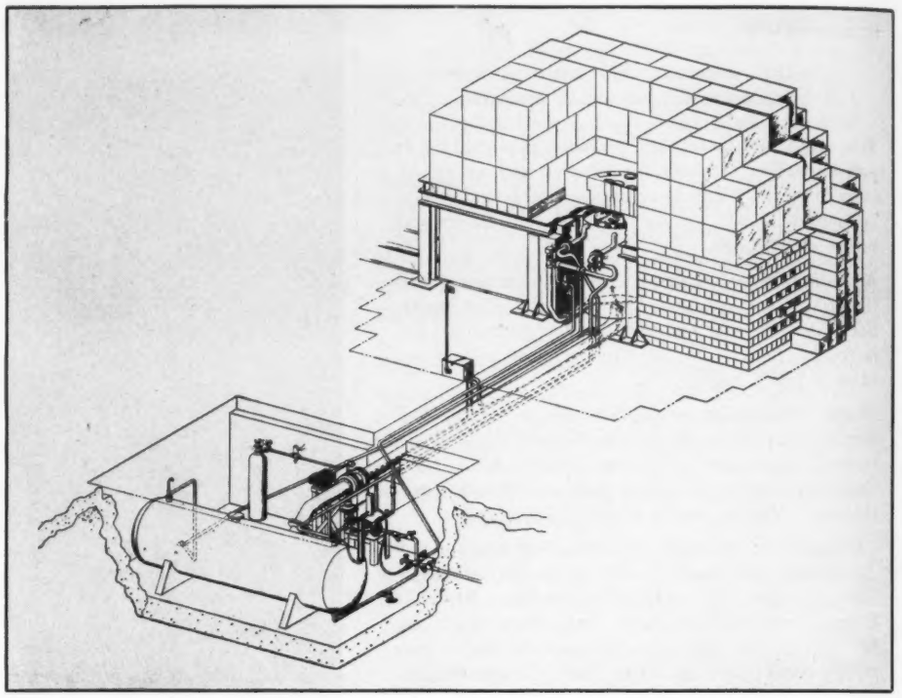
ideas — from other industries and nuclear field . . . new trends in research, processes, services



Utility trench below reactor contains water, gas, and electric lines, and leads to pit containing dump tank

Argonne introduces the "Argonaut" — a safe, low-cost . . .

nuclear reactor for tra

Maximum power output is 10 kilowatts; features annular core for greatest flexibility

TED F. MEINHOLD, Associate Editor

Availability of a safe, simple, low-cost nuclear reactor now makes it possible for students in nuclear sciences to get first hand experience in reactor technology. Developed at the AEC's Argonne National Laboratory, Lemont, Illinois, the reactor was specifically designed to fill the need for a low-power training reactor. Its simplicity and flexibility is such, that it also fits the bill for an excellent research tool.

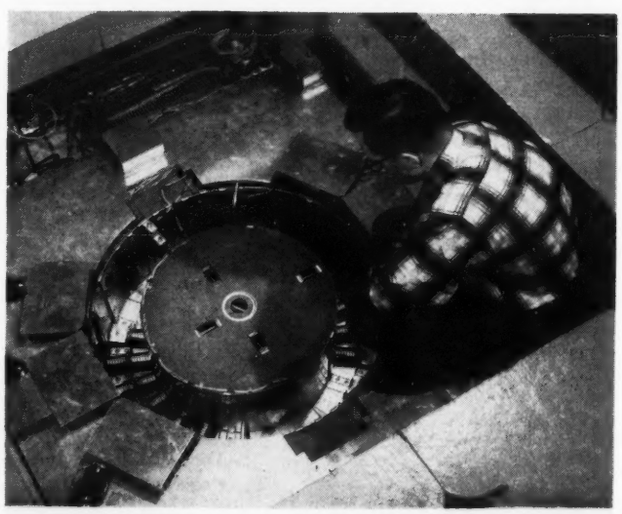
Maximum power output for the "Argonaut" (Argonne nuclear assembly for university training) is 10 kilowatts. Construction cost is about $100,000, excluding fuel and erecting costs, which is quite low as far as present-day reactor prices go. The unit can be installed and operated in any existing building of suitable size, using only a minimum of skilled help.

At least two industrial firms (Daystrom Inc. and American Radiator & Standard Sanitary Corporation) have already asked for the privilege of manufacturing and marketing the reactor. They have also offered to provide training to instructors of universities and

Turn to page 76

The reactor can be installed and operated in any existing building of suitable size, using only a minimum of skilled help

for training and research



David H. Lennox, Argonne National Laboratory, inspects inside of Argonaut reactor. Fuel plate clusters can be seen suspended in the annular core

now make any vessel CHEMICAL RESISTANT...

Applications range from this small reactor-pot to linings for trailer tank trucks.

...with KEL-F LAMINATE lining

Here is a method for making ordinary plant equipment (new or existing) resistant to gases and liquids as corrosive as fuming nitric acid—and at reasonable cost.

KEL-F Laminate comprises a tough, shatterproof, abrasion-resistant, frictionless surface of KEL-F* fluorocarbon plastic, bonded to a glass-cloth backing for maximum adhesion. It is readily cemented to any material of construction—metal, wood, concrete, etc.—and over a variety of contours.

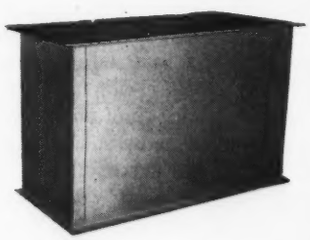
KEL-F, being a thermoplastic resin, seams may be "heat-welded". The result is a continuous surface having zero water absorption and extremely resistant to acids, alkalies, oxidants and solvents at temperatures up to 350°F.

KEL-F Laminates are manufactured by the United States Gasket Company, pioneers and leaders in fluorocarbon plastics, and are available for installation by certified applicators. Write for further information and the name of applicator nearest you.

UNITED STATES GASKET COMPANY, Camden 1, New Jersey

**Trademark, M.W. Kellogg Co.*

100 gal. Tank handling acid fluorides, lined with KEL-F Laminate.



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For the first time, bulk quantities of low-cost, 99+% pure dimethyl sulfide are available to industry.

Dimethyl sulfide is a simple organic liquid derived by Crown Zellerbach Corporation from lignin and sulfur under exclusive patent rights. Integration of its production with the kraft pulping process affords reduced cost and tank car availability which will project dimethyl sulfide into applications heretofore considered uneconomical.

Suggested application: Crown dimethyl sulfide is useful both as a basic chemical and as an intermediate in the synthesis of sulfur compounds. It is also well suited to the following functions:

- As a solvent in extraction.
- As a solvent vehicle.
- As an odorant or masking odor.

The staff of the Chemical Products Division of the Crown Zellerbach Corporation offers its research facilities to explore applications of specific interest to you. For information brochure concerning properties, solubilities, chemical reactions, and uses of this important industrial chemical write to:

CROWN ZELLERBACH CHEMICAL PRODUCTS DIVISION
CAMAS, WASHINGTON

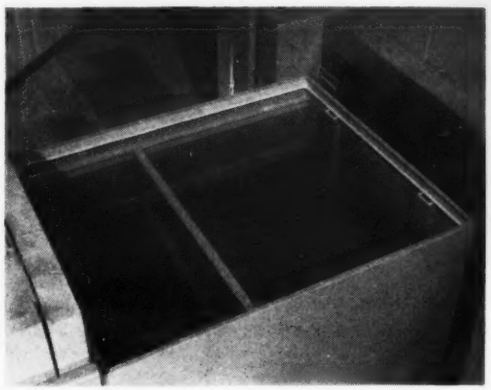
When inquiring check 3911A opposite last page

Training Reactor

Starts on page 74

other institutions which would be interested in using the reactor for educational and training purposes.

The prototype is currently being used by students attending Argonne's International School of Nuclear Science and Engineering. It was officially turned over to the school on March 29, 1957, during a two-day industrial and educational symposium held at the laboratory. The reactor first went critical on February 9, in the midst of the dedication of Argonne's Experimental Boiling Water Reactor, the first plant-size power reactor in the US (see CHEMICAL PROCESSING, April 1957, pages 14-15).



Demountable tank on flat-bed truck is used to test shielding characteristics of various liquids

According to officials at the school, the new reactor may prove as important in the area of nuclear education as the EBWR is in the field of nuclear power. Here are some of things that the school can do with it. Students may participate in observing the behavior of the reactor as fuel is added to make it critical. It can be made to change power in a number of ways to observe its response to control rod operations and also its response to simulated operating conditions at high power. Poisons and bubbles, such as may be produced by boiling in a power system, can be introduced and their effects observed. Chain reactions can be achieved with many different shapes of fuel loading and correspondingly different critical masses. Distribution of fissions in the fuel can also be studied.

Reactor Description

The reactor is a thermal, heterogeneous, water-cooled unit. It has an annular core, with internal and external graphite reflectors. Water is used as moderator. Maximum flux is 5×10^{11} neutrons per cm per second at power level of 10 kw. Critical loading is about 4 kg of U^{235}.

The lattice is a graphite cube 5x5x4′ high, containing a centrally-located water annulus 2′IDx3′ODx4′ high,

formed by two concentric aluminum tanks. Against once face of the cube is a graphite thermal column 5x5x4′ high. On the face opposite the thermal column is a mobile flat bed truck to which is assembled a demountable water tank 4x6x3½′ high. This may be used for shielding studies using various aqueous media. Solid materials may also be stacked on the bed of the truck. Concrete blocks are stacked against the remaining two faces of the cube.

There is a total of 22 experimental ports in the reactor, five of which are vertical, and 17 of which are horizontal. The top of the reactor is free of mechanisms, making it accessible for loading of fuel assemblies, insertion of experiments in the center reflector, and for possible placement of an exponential assembly.

There are about 190 fuel plates arranged in 12 clusters in the reactor core. Fuel plates are 2-27/32″ wide, 24″ long, and 0.096″ thick. They consist of 40 weight %, U_3O_8 (20% enriched) suspended in an aluminum matrix. Start-up source is an antimony plug inserted in a beryllium cube. It is moved into the fuel zone by an electric drive. The source is capable of producing 10^8 neutrons per second.

Heat generated in the core is removed by circulating water between the fuel plates. Circulation rate is about 6.5 gpm at maximum power level. At 10 kw, heat amounts to about 50 watts or 170 Btu per hour per plate.

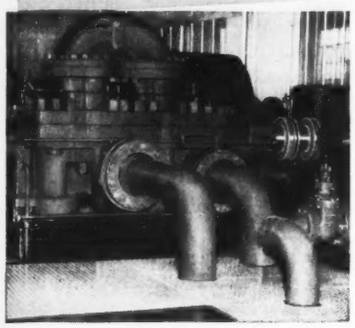
In addition to the inherent safety of this type of core, the reactor has a number of other safety features. During start-up, the reactor must be brought to criticality in a specified manner. A sequential system of interlocks assures this. Operator cannot go from one step to another unless the previous interlock has been satisfied. Control is also achieved by conventional absorbing materials located next to core in outer reflector. Gravity-actuated, cadmium control rods, operated by a winch-type mechanism are used to adjust power level.

Immediate emergency shutdown can be accomplished by the simultaneous operation of two independent systems. One dumps the water moderator while the other rapidly decreases the bulk density of it. Latter is done by injecting nitrogen gas into the moderator through a quick-opening valve. The injection system is made "fail-safe" by nitrogen gas pressure closing normally open switch in the reactor's interlock system.

The terminal end of the water dump line is connected to an electrically-operated butterfly valve held open by a magnetic clutch. Weighted lever arm opens valve when clutch is de-energized, emptying water into tank. A utility trench below reactor (see drawing) contains the 6″-diam dump line, cooling water line, and gas and electric lines. Trench terminates in 7x11x4′-deep covered utility pit containing the 275 gal dump and make-up water tank.

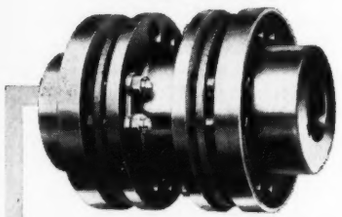
(Information and photos for this article were obtained from Argonne National Laboratory, Dept. CP, Lemont, Illinois.)

THOMAS FLEXIBLE COUPLINGS PROTECT Your Pumps



Pump troubles such as replacement of packing glands and bearings are practically eliminated when Thomas Flexible Couplings are used.

There is a THOMAS Coupling for every purpose.



UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.

1. No Cross-pull on Bearings or Gland.
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4. Free End Float.
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9. No Wearing Parts.
10. No Maintenance.

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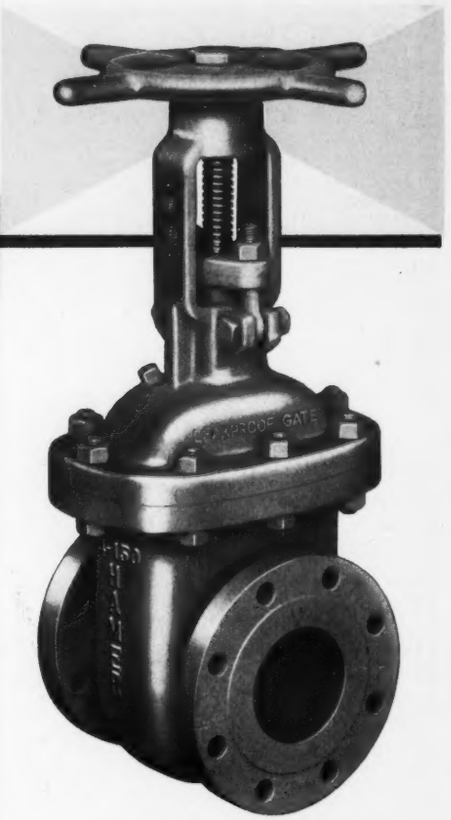
When inquiring check 3912 opposite last page

Introducing the new

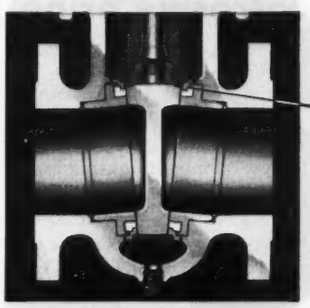
HAMER *Leakproof* **GATE VALVE**



Impenetrable Shut-off Upstream —Downstream

This new Hamer Gate Valve incorporates a double sealing action design that's both absolute and foolproof. In addition to the precision metal to metal fit of the wedge, the Hamer Gate Valve incorporates two Teflon* seal rings which compress dead tight against the wedge. Thoroughly proven under the most rugged field condition tests, the Hamer Gate Valve with its positive shut-off both upstream and downstream, eliminates the need for a double block and bleed in piping installations.

Hamer Gate Valves incorporate a new high standard of valve production. Stainless steel valve seats are welded-in for accurate fit. Locking rings are of corrosion resistant stainless steel. And precision finish on critical parts assure a smooth operating valve even after years of hard service. Write today for literature. See for yourself why Hamer Gate Valves are truly **a valve without equal.**



Double Sealing Action forms Impassable Shut-off

TEFLON SEAL RINGS... Renown for their inert characteristics, these Teflon seal rings have amazing durability even under the most adverse of service conditions.

PRECISION FINISHED GUIDES... Wedge guides are machined to exacting tolerances. Eliminates chatter and wear caused by line pulsations, accurately centralizes the wedge between the seats.

*RTM DUPONT

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Representatives throughout the World

When inquiring check 3913 opposite last page

Crane Valves Handle Corrosive Fluids Without Costly Leakage

Valve life more than doubled in this corrosive brine service

After more than 10 years' service on strong brine, these valves are still operating with high efficiency.

They are Crane No. 461 iron body gates, installed on a brine and condensate line at the world's largest sea water salt plant—located in Newark, Calif., and owned by Leslie Salt Co.

Before changing to the Crane valves, the plant was having difficulties with lubricated plug cocks. The plugs pitted; the cocks leaked continually, and had to be replaced within 5 years. Installing Crane iron gate valves put a stop to the problem, eliminating leakage and replacement costs.

For more information on Crane iron body valves for many corrosive services, see your local Crane Representative, or write to Crane Co., address below.

GET YOUR COPY of "Valve Performance Facts"—32 illustrated case histories covering valve installations throughout industry.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill., Branches and Wholesalers Serving All Areas

When inquiring check 3914 opposite last page

'Wet combustion' pilot plant to process municipal sewage in Chicago

Scheduled to go into operation late this summer; end products are water and odorless ash

Pilot plant for disposing municipal sewage by means of "wet combustion" is scheduled to go into operation in Chicago late this summer. Known as the Zimmermann process, it has been proven on waste pulp liquors from paper plants and holds promise of sharply reducing costs of sewage disposal.

Process consists essentially of burning the sewage in the presence of water. End products are water with an acceptable chemical oxygen demand, and a small amount of odorless ash. There are no drugs or chemicals used.

The test plant will evaluate the cost of burning sewage sludge in various concentrations ranging from two to six percent or more. The results should provide answers as to which concentrations give the best results. They will also show how process compares economically with other methods now in use.

Equipment consists of sewage settling tank, preheater, air compressor, reactor, and product settling tank. Settled wet sludge is heated to about 600°F in the preheater and sent to the reactor where it undergoes wet combustion with 1000-1500 psi air supplied by compressor. Sludge serves as fuel while air provides necessary oxygen and heat. It is estimated that sludge can furnish from 7000 to 7500 Btu per lb of dry solids. Process becomes self-sustaining when the compressed air is added. Steam and ash, drawn off from process as they are formed, flow to product settling tank. Condensed water is decanted and the ash is dumped.

A large commercial plant using the process is now under construction in Norway for that country's largest pulp and paper manufacturer. Process will be used to convert waste pulp liquors into steam, while eliminating the pollution problem.

(Process was developed by Sterling Drug Inc., Dept. CP, 1450 Broadway, New York 18, New York.)

Describes engineering services and laboratory facilities

Bulletin of 24 pages describes engineering and laboratory facilities available for contract research to private companies, government agencies, and other organizations. Illustrations show scope of test apparatus and views of typical research projects.

Bul S 1053 is issued by Selas Corporation of America, Dept. CP, Dresher, Pa. When inquiring specify 3915 on form opposite last page.

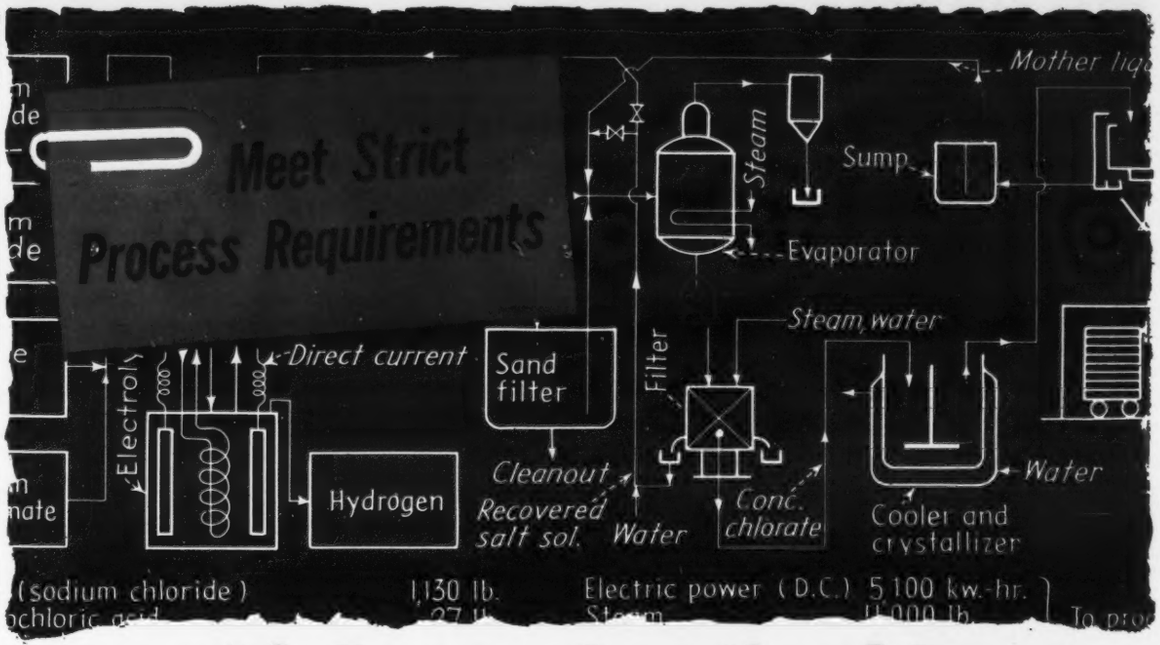
Penicillin produced synthetically — ten new kinds being tested . . .

may be effective against disease organisms now resistant to natural penicillin

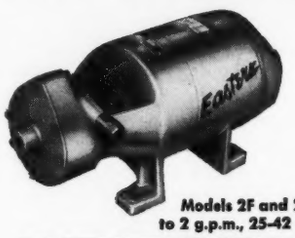
The problem of producing penicillin by chemical synthesis has been solved by MIT chemistry professor, Dr. John C. Sheehan. Ten new kinds are currently being tested for possible medical use. Although the new method may not be able to compete economically with the established fermentation process, it is hoped that the new forms will prove effective against disease organisms now resistant to natural penicillin, and against a wider variety of infections. Synthetic products might also have less tendency to produce allergic reactions.

The penicillin molecule, although not unusually complex, is unstable and disintegrates easily — especially at one point in the process. In constructing it in the laboratory, the final step is so delicate that, unless properly done, the structure collapses. Consisting chiefly of a series of reactions at room temperature or below, technology used is expected to be useful in solving other chemical problems. Crucial step in process occurs when carbon atom is bonded to nitrogen atom, completing structure of final product, phenoxymethylpenicillin, known as penicillin V, the antibiotic which is commonly administered by mouth.

(Research work was conducted at Massachusetts Institute of Technology, Dept. CP, Cambridge 39, Mass.)



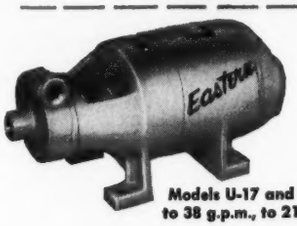
. . . with Eastern Centrifugal Pumps



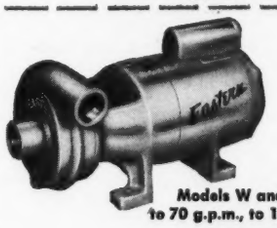
Models 2F and 2J
to 2 g.p.m., 25-42 p.s.i.

Model D-11
to 7.5 g.p.m., to 18 p.s.i.

Model F
to 17 g.p.m., to 17 p.s.i.



Models U-17 and U-34
to 38 g.p.m., to 21 p.s.i.



Models W and Z
to 70 g.p.m., to 11 p.s.i.

Models 3F and 3J
to 5 g.p.m., 29-65 p.s.i.

Recent redesign of these close-coupled Centrifugal Pumps has gained tremendous ruggedness and allowed for a wide selection of power requirements. In every detail of size, weight, space requirements, power, and costs, Eastern pumps fill the bill for strict process standards.

Six standard models range from 1/8th to 3/4 H.P., with capacities up to 70 G.P.M., pressures to 65 P.S.I. Eastern Centrifugal Pumps are available in Cast Iron, Bronze, Stainless Steel, Monel, and Hastelloy "C".

Eastern's engineering service offers many special models to meet your specific needs as to capacity and construction. Recommendations entail no obligation, and your inquiries are invited.

NEW EASTERN CATALOG

Eastern Centrifugal Pump Catalog contains engineering data, performance charts, diagrams and helpful general information. Request Bulletin 110E.

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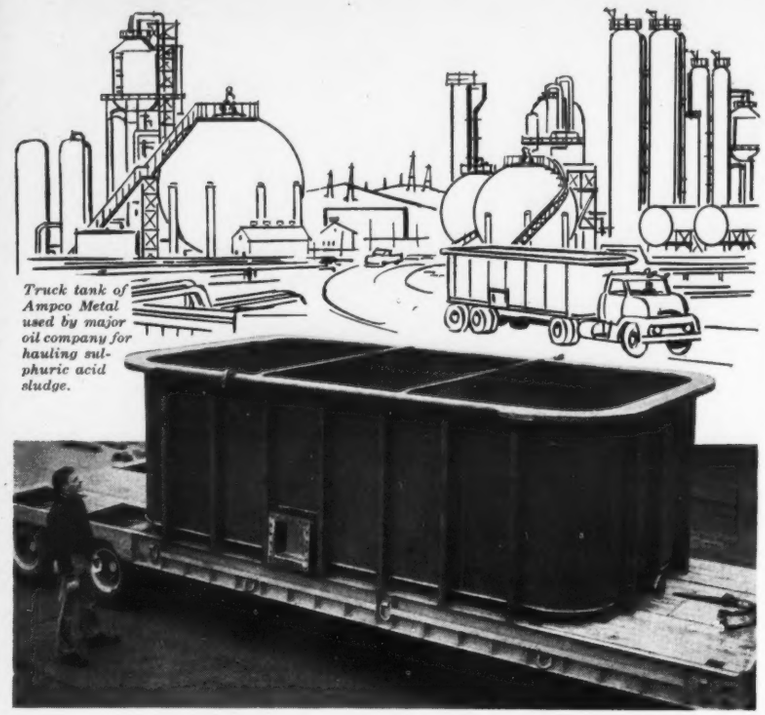

Truck tank of Ampco Metal used by major oil company for hauling sulphuric acid sludge.

Handles 35% Solution of Hot Sulphuric Acid Sludge

Truck tank...made from Ampco Metal Grade 8 plate...resists corrosion

Ampco Metal resists corrosion, erosion, and cavitation-pitting caused by...

Boiling sulphuric acid (up to 50%)

Hot concentrated caustic solutions

Fatty acids

Hydrofluoric acids

Abrasive solids in suspension

Other problem liquids and abrasives

Ampco Metal has exceptional resistance to the destructive attack of many alkaline and acid media.

That's one reason why this aluminum-bronze alloy is used in fabrications like the truck tank shown here; in pipe, fittings, and other forms.

There are other reasons, also:

(1) Ampco Grade 8 can be readily sheared, bent, formed, or deep drawn.
(2) It is easy to weld with Ampco-Trode* by the metal-arc, carbon-arc, MIG or TIG processes.
(3) It possesses high impact and fatigue strength.

You can get Ampco Metal in sheet, plate, extrusions, sand and centrifugal castings, pipe fittings, fasteners, tubing, pumps, valves, etc.

Ask your Ampco field engineer for further facts — or write us. *Reg. U. S. Pat. Off.

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THE METAL WITHOUT AN EQUAL

SAND CASTINGS

CAST FLANGES

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CENTRIFUGAL CASTINGS

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CAST PIPE FITTINGS

FABRICATIONS

SHEET AND PLATE

MACHINED PARTS

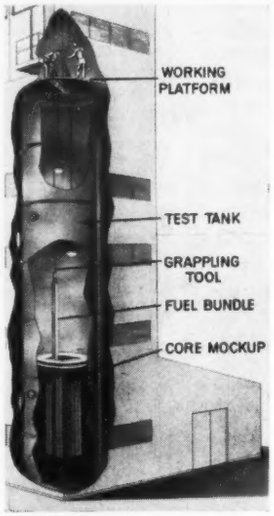
PR-24

When inquiring check 3917 opposite last page

Special test facility constructed for developing nuclear reactor refueling techniques . . .

periscopes and closed-circuit television included as part of the accessory equipment

Test facility has been constructed at San Jose, California, specifically for developing refueling procedures for the 180,000-kw Commonwealth Edison Dresden nuclear power station to be constructed near Chicago, Illinois. The facility is housed in an 86-ft high structural steel tower. Main component is an all-welded 14-ton steel tank, 56-ft high by 8-ft in diameter, which simulates the pressure vessel of the large boiling water reatcor. Reactor core mock-up is installed in the tank, which is filled with water.



Main component of test facility is an all-welded 56-ft high steel tank

The facility was developed to serve as a proving ground for new remote handling tools designed for the manual refueling of the Dresden station reactor. It will enable technicians to test procedures and equipment under essentially identical conditions to those in the actual reactor.

Technicians operating the facility will work from a platform above the tank using crane-supported, long-handled grappling hooks to insert simulated nuclear fuel bundles in the reactor core, 40 feet below the surface of the water. An underwater camera placed close to the reactor core will enable personnel to watch while fuel bundles are inserted and removed.

Closed-circuit television and periscopes are part of the accessory equipment. The facility will also be suitable for use with other boiling water-type reactors.

(Test facility was designed by the General Electric Company, Dept. CP, Schenectady 5, N.Y.)

The alphabetical Product Directory starting on page 237 will give you a page reference to all articles and advertisements in this issue

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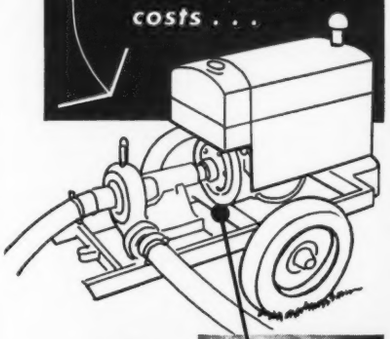
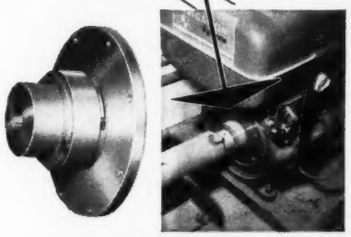
Flywheel-to-Pump Coupling

saves space, installation time and equipment costs . . .





The Lovejoy Type CF Coupling is completely maintenance-free, requires no lubrication and will deliver top performance year after year regardless of dust, dirt, mud or water. Especially designed to bolt directly to the flywheel, it eliminates the stub shaft and provides a simplified and compact engine to pump drive.

Chemical equipment manufacturers, users and dealers can use the CF Coupling to gain these important advantages:

- **Reduce original equipment costs**
- **Cut assembly and installation time**
- **Provide a closer coupled unit**
- **Reduce base requirements**
- **Minimize operational costs**

Get full details on the CF Coupling. Ask for Bulletin 606 containing coupling and engine specifications.

Lovejoy — FIRST NAME IN FLEXIBLE COUPLINGS

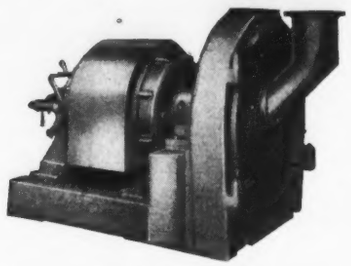
LOVEJOY FLEXIBLE COUPLING CO.
4808 W. Lake St. Chicago 44, Ill.

When inquiring check 3918 opposite last page

DO YOU KNOW?

BAUER
Single Disc Attrition Mills are Used for

- GRANULATING
- FLUFFING
- BLENDING
- TEXTURIZING
- MIXING
- FIBERIZING
- GRINDING



Available in 7 sizes, 8" to 44" diameter. Ask for Bulletins S-2, A-7, P-13.

If you have a processing problem, we invite you to take advantage of our Research Laboratory. We maintain full-sized machines for evaluating operational data and helping our customers develop new processes.

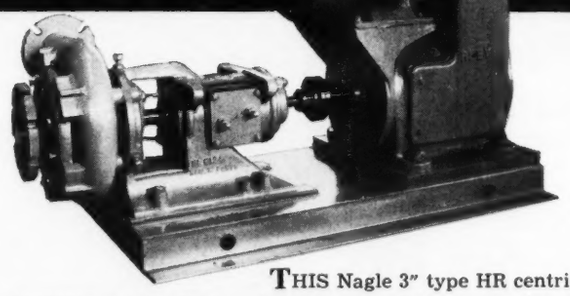
In addition to single and double revolving disc attrition mills, we offer hammer mills, breakers, crushers, laboratory mills, cleaners, classifiers, specific gravity separators, and related machines. The full line is illustrated and described in our Catalog No. 52. A copy is yours upon request.

Bauer

THE BAUER BROS. CO.
1728 SHERIDAN AVE. • SPRINGFIELD, OHIO
Established 1878

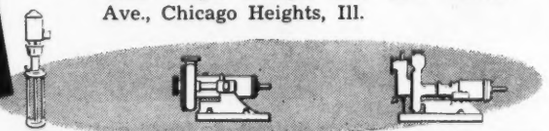
When inquiring check 3919 opposite last page

LIME SLURRY IS "DUCK SOUP" FOR THIS Nagle® PUMP!



THIS Nagle 3" type HR centrifugal pump is giving outstanding performance at a large processing plant. It handles lime slurry. Variable speed drive for control of volume. The Nagle "H" series—of which the HR is one—is ideal for economically handling abrasive mixtures and slurries, corrosive and hot liquids. Can be placed above or below sump liquid level. Sizes from 1" to 10". Heads to 250'. Capacities to 4000 GPM. Send for data. Nagle Pumps, Inc., 1247 Center Ave., Chicago Heights, Ill.

NAGLE PUMPS



PUMPS FOR ABRASIVE AND CORROSIVE APPLICATIONS

When inquiring check 3920 opposite last page

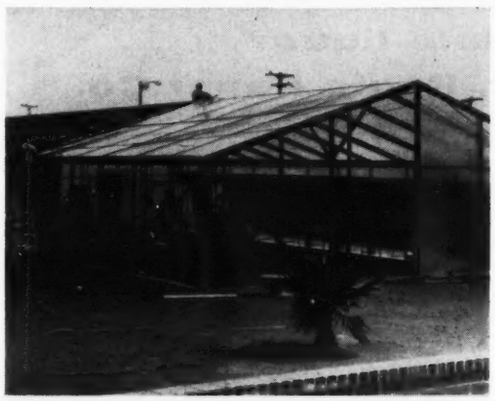
Use of synthetic fibers in paper being developed by St. Regis

Means of using man-made fibers, singly and in combination with natural fibers on conventional paper-making equipment, are being developed by St. Regis Paper Co. By varying proportions and fiber types it is expected that production of variety of paper grades will be possible, embodying properties of one or more fibers. Thus far nylon and "Dacron" polyester fibers have been tested.

Future tests are expected to include all synthetic fibers now produced. Some of characteristics possible by use of synthetics are: resistance to mold, rot, chemical attack, and sunlight; good electrical properties; outdoor weatherability; dry cleanability; high dimensional stability; and low moisture absorption. Work in this field is currently in the laboratory and pilot plant stage.

(Additional details on use of nylon, Dacron, and Orlon fiber for paper production may be obtained from Textile Fibers Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. . . . or for more information check 3921 on form opposite last page.)

Makes shelter of polyethylene film; finds cost less than renting tent

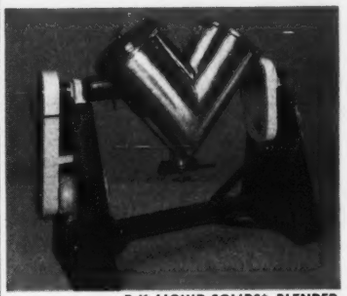


When Carbide & Carbon Chemicals opened their Torrance, California, plant recently they needed a temporary shelter for guests that was approximately 120' by 40'. Cost of renting a tent was $1300. Cost of making a wood frame and covering the roof and three sides with polyethylene film was $1000. Added bonus: standard length lumber was used; when shelter was knocked down, wood was sent to the plant, later re-used.

(Polyethylene is a product of Bakelite Co., a Div. of Union Carbide & Carbon Corp., Dept. CP, 260 Madison Ave., New York 16, N.Y. . . . or for more information check 3922 on form opposite last page.)

This coupon will bring you all the facts on how..

you can blend liquids-solids in one fast step



P-K LIQUID-SOLIDS* BLENDER

- Intimately blends controlled amount of liquids of any viscosity
- Wire cage assembly prevents lumping
- Production models up to 50 cu. ft.
- Lab models available in 8 and 16 quart sizes, with transparent Lucite or stainless steel shells
- Three blenders in one—use as is for intensive blending; remove bar for plain blending
- Easy to charge, easy to empty, easy to clean
- Designed for pump or gravity feed

*Pat. Pending

The Patterson-Kelley Co., Inc.
126 Hanson St., E. Stroudsburg, Pa.

Yes! I want to find out everything about the new p-k Liquid-Solids* blender. Send me your new catalog 15-A plus a price list.

Name_____

Company_____

Address_____

City_____ State_____

Patterson-Kelley

When inquiring check 3923 opposite last page

Data from Time and Motion Study and Managament Clinic

Proceedings of 20th annual Time and Motion Study and Management Clinic are contained in 112-page book. Complete transcripts of talks by top leaders of labor, management, and government on various topics including time study, motion economy, methods, work simplification, plant layout, production control, wage incentives, maintenance, and job evaluation are presented. As an aid in presentation of the material, charts, forms, and illustrations are included.

To obtain clinic proceedings remit $5.00 direct to Industrial Management Society, Dept. CP, 35 E. Wacker Dr., Chicago 1, Ill. When inquiring specify 3925 opposite last page.

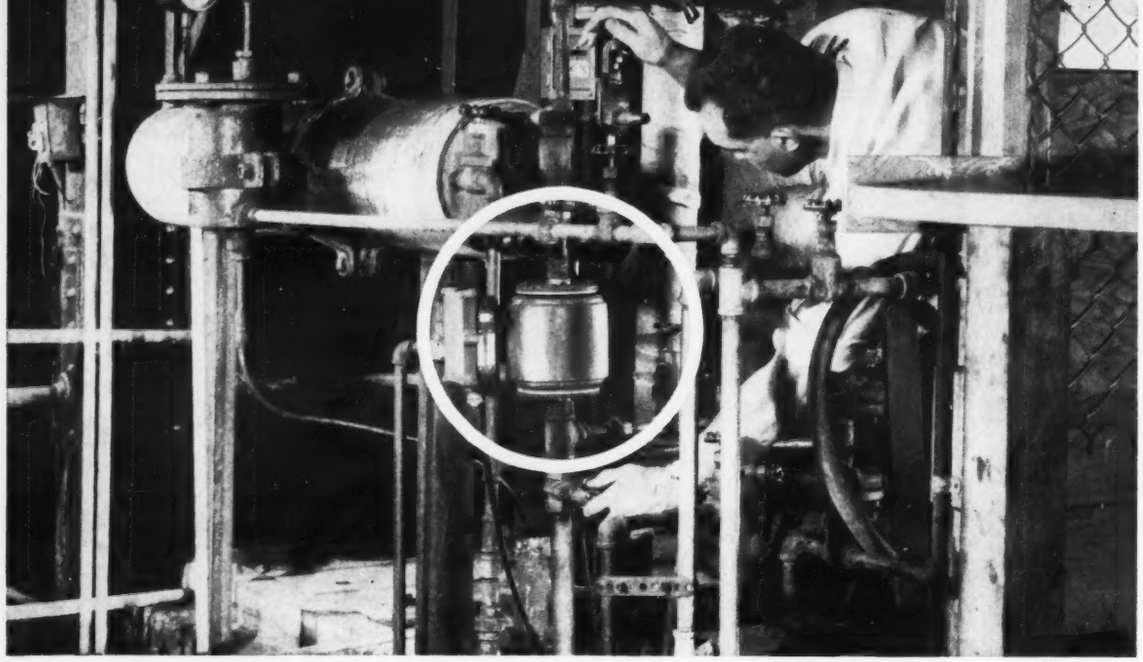
Fluid flow experiments at Battelle to aid Shippingport reactor . . .

results will assure that proper cooling is provided to all parts of the reactor

Fluid flow experiments, being conducted at the laboratories of Battelle Institute, are helping to bring nuclear power closer to reality. Studies are being made on a quarter-scale model of the large boiling water-type reactor being built by Westinghouse Electric Corporation for the Duquesne Light Company's nuclear power plant at Shippingport, Pa.

Data gathered in the experiments will assure technologists that adequate cooling is provided to all parts of the reactor. In the laboratory, a large manometer board is used to measure the liquid level, and thus the air pressure, at 350 separate

Manometer board (right) indicates air pressure at 350 separate points in the reactor model (center)



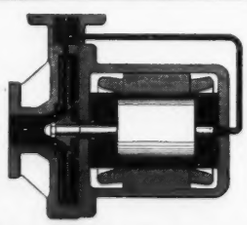
Chempump aids research program

handling sulfate liquor at St. Regis Paper Co.

Hot, black sulfate liquor is pumped into experimental digesters by this *Chempump* at St. Regis Paper Company's plant at Tacoma, Washington. Unlike conventional pumps, the *Chempump* is leakproof and virtually maintenance free . . . features that eliminate downtime and help speed the company's research program.

This *Chempump* can't leak, for it is a totally enclosed unit—no seals, no stuffing box, no packing. External lubrication is never required, as bearings are constantly lubricated by the pumped fluid itself. Extremely compact, the *Chempump* mounts right in the pipeline.

Where you require dependable, leakproof pumping, put a *Chempump* on the job. You'll profit considerably from its many advantages. For details concerning your specific application, write to Chempump Corporation, 1300 E. Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



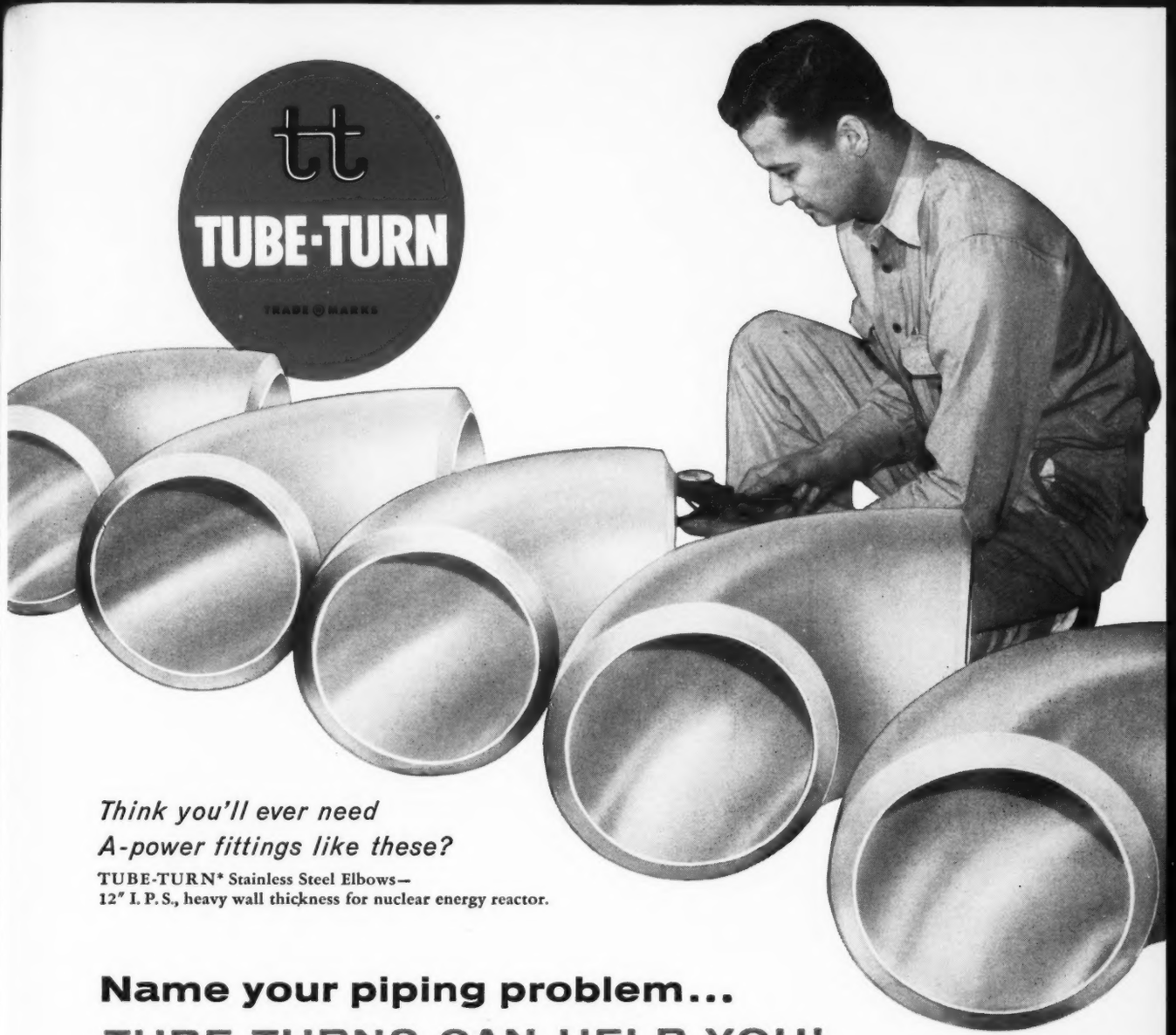
Chempump combines pump and motor in a single, leakproof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

Chempump

First in the field...*process proved*

When inquiring check 3924 opposite last page



Think you'll ever need
A-power fittings like these?

TUBE-TURN* Stainless Steel Elbows—
12″ I. P. S., heavy wall thickness for nuclear energy reactor.

Name your piping problem...
TUBE TURNS CAN HELP YOU!

No matter what kind of welded piping system you build . . . here's how Tube Turns can be of help:

Tube Turns' line includes 12,000 *standard* welding fittings and flanges, plus thousands of *specials* such as the A-power fittings shown above. When you buy from this *complete-line* leader, you get what you need *promptly* . . . products of unsurpassed *quality* . . . backed by experienced *engineering service* . . . for reliable, *low-cost piping.* Order from your nearby Tube Turns' Distributor.

*"TUBE-TURN" and "tt" Reg. U. S. Pat. Off.

The Leading Manufacturer of Welding Fittings and Flanges

TUBE TURNS LOUISVILLE 1, KENTUCKY

A Division of National Cylinder Gas Company

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Chicago • Detroit • Atlanta • New Orleans • Houston • Midland
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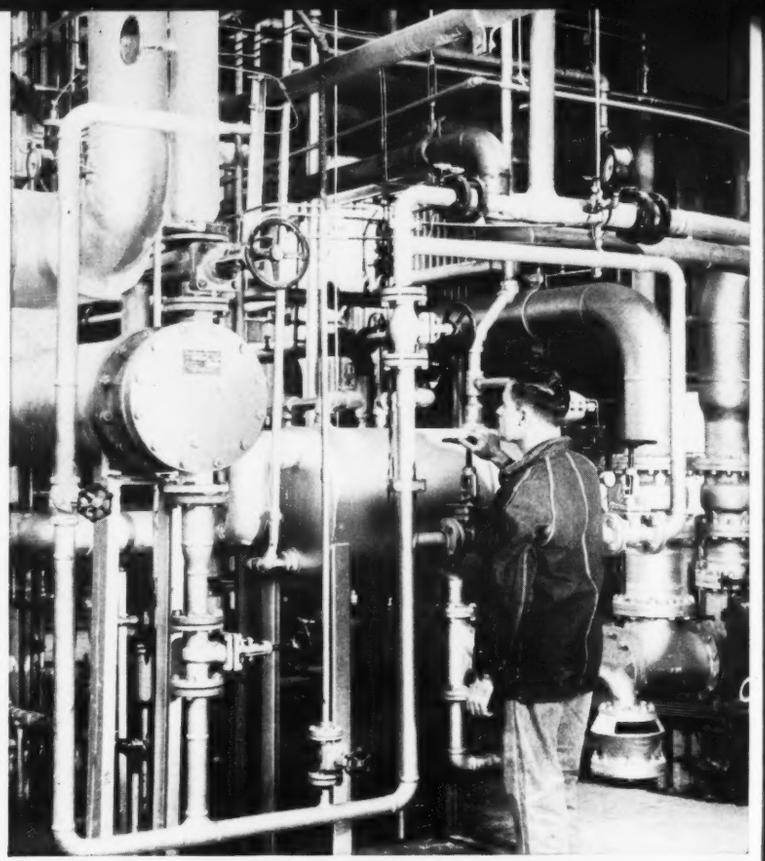
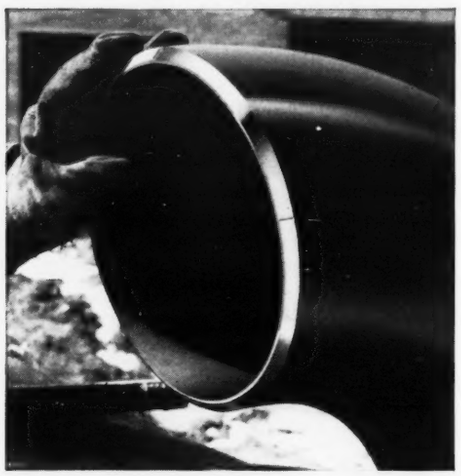
HOW YOU SAVE

12,000 "TUBE-TURN"® PRODUCTS

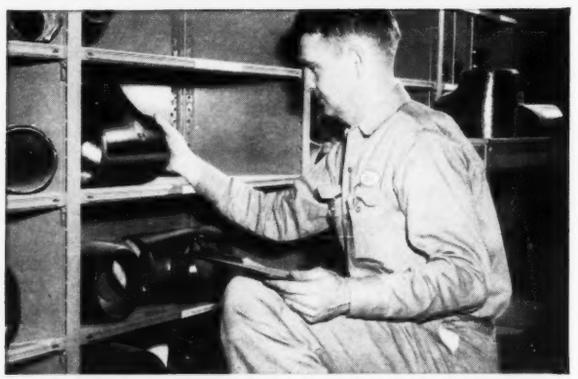
to help you save 3 ways...



SIMPLIFIES ENGINEERING. There's no compromise when you specify TUBE-TURN products. You can count on getting the exact fittings for your project ...the right type, size, schedule and material for every piping service. Shown at right: Aluminum piping with TUBE-TURN Welding Fittings and Flanges, in water purification plant of The General Tire & Rubber Company, Chemical Division, Ashtabula, Ohio.



SPEEDS UP THE JOB. Uniform size, circularity, wall thickness of TUBE-TURN Welding Fittings assure good fit-up and alignment . . . help make piping installation work faster. Each fitting is marked with *complete* specifications for quick, accurate identification. Quartermarked bevels simplify fabrication.



ONE-ORDER PURCHASING. Your nearby Tube Turns' Distributor provides this complete-line service promptly. Hence, you can make *one order* fill all your needs in welding fittings and flanges . . . to cut red tape and save purchasing time.

HELPFUL DATA. New Tube Turns' booklet gives information on pipe, fitting and flange materials. Mail coupon for your free copy.

TUBE TURNS, Dept. KK-3
224 East Broadway, Louisville 1, Kentucky

Please send free copy of Pipe, Fitting and Flange Materials.

Company Name _____

Company Address _____

City _____ *Zone* _____ *State* _____

Your Name _____

Position _____

Available from your nearby TUBE TURNS' distributor

*"TUBE-TURN" and "tt" Reg. U.S. Pat. Off.

TUBE TURNS

LOUISVILLE 1, KENTUCKY

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Chicago Detroit • Atlanta • New Orleans • Houston • Dallas • Midland Tulsa • Kansas City • Denver • Los Angeles • San Francisco • Seattle
***In Canada:* Tube Turns of Canada Limited, Ridgetown, Ontario Toronto, Ontario • Edmonton, Alberta**

points in the model. Air flow through the model is provided by large fans that force air through the reactor at 5.5 psi.

Water will be used to cool the full-sized reactor. When completed, the power plant will generate at least 60,000 kw. It will be the first large-scale atomic power electric generating plant in the US.

(Information courtsey of Battelle Memorial Institute, Dept. CP, Columbus 1, Ohio.)

Describes engineering services and facilities

Booklet of 36 pages describes and illustrates engineering consulting services and facilities for chemical processing and other industries. Project organization and locations and general company organization are discussed. Engineering services, construction operations, turnkey operations, and supporting services are described.

"This is Kaiser Engineers" may be obtained by writing direct to Kaiser Engineers, Div. of Henry J. Kaiser Co., Dept. CP, Kaiser Bldg., Oakland 12, Calif.

". . . To keep the workers from getting soft — a pushbutton that pushes back!"

Thanks to James V. Redding, The Central Pharmacal Company, Seymour, Indiana.

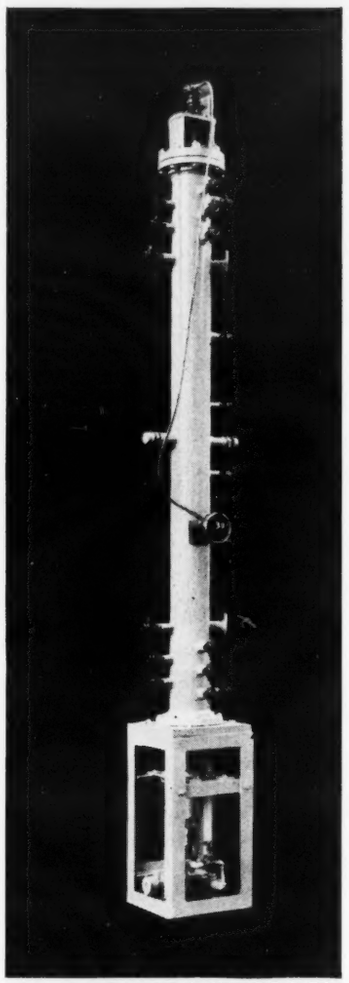
For more information on product at left, specify 3926 . . . see information request blank opposite last page.

Turbo-Topics

TURBO-MIXER GENERAL AMERICAN TRADE MARK

TURBO-MIXER, a division of

GENERAL AMERICAN TRANSPORTATION CORPORATION



Typical Turbo-Mixer R.D.C. Pilot Column (6" x 8'0") For Research or Design Studies

Pre-Testing Proves that the Turbo-Mixer R.D.C.* Column can solve Your Extraction Problems

Every extraction problem is a bit different. That's why you benefit from Turbo's eight years of research, piloting and industrial scale installations that provide a background of experience applicable to your problems.

Even more important, our laboratory is completely equipped to make specimen runs on your materials and develop reliable plant scale design. Your engineers are invited to observe these laboratory runs. Pilot scale equipment can be built for development studies at your own plant, if you so desire.

The R.D.C. extractor offers you:

1. ***High Volumetric Efficiency;***
2. ***High Thru-Put Capacity;***
3. ***Simplicity of Construction;***
4. ***Low Power Requirements;***
5. ***Flexibility of Operation.***

Our engineers are at your service for application of the R.D.C. to your extraction problem. For further information and descriptive bulletins, write today.

*Licensed under Shell Development Company Patent

SALES OFFICE: 380 MADISON AVENUE, NEW YORK 17, NEW YORK
General Offices: 135 S. La Salle St., Chicago 90, Illinois • Offices in all principal cities

When inquiring check 3927 opposite last page

It might pay you to
look into Inco castings
Write today for "Cast to Outlast." This 16-page booklet shows how much can be done to improve equipment performance with Inco-Cast Monel nickel-copper alloy and seven other cast Inco Nickel Alloys.

Heart of a Dowell "chemical brush" —an Inco-cast Monel impeller

Here's the heart of a cleaning unit that pumps corrosives at high velocities through chemical equipment. The unit is made by Dowell Incorporated, of Tulsa.

Dowell engineers use this impeller of Inco-Cast Monel* nickel-copper alloy to pump cleaning solvents. Composed largely of hydrochloric acid, these solvents are pumped from special tank trucks, into plant piping and equipment, to dissolve troublesome scale and deposits.

To protect the pipe and equipment from this dilute hydrochloric, Dowell strictly controls temperatures and exposure time. And they use specific inhibitors to prevent corrosion.

But how would Dowell protect their pumps? The high velocities would throw off inhibitors and coatings.

After testing scores of materials, Dowell engineers decided on Inco-Cast impellers of Monel nickel-copper alloy. They selected this alloy because it resists attack by dilute hydrochloric acid. And by caustic solutions and compounds containing fluorine, which are sometimes added to dissolve silicate scale.

Stuffing box seals and shaft sleeves are also made of this corrosion-resisting nickel-copper alloy. Likewise, pins for acid tanks. And usually, the flange and nipple on field tanks are Monel nickel-copper alloy, too.

Whenever you are confronted with destructive service conditions, be sure to investigate the advantages Inco-Cast alloys can provide. One of these may be the answer to your difficulty.

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

INCO TRADE MARK **Castings...** *Sand, Centrifugal and Precision*

When inquiring check 3928 opposite last page

Super-strong magnet developed with invisible iron 'dust' . . .

can be made 10 times stronger than conventional units

By precisely controlling size and shape of individual iron particles so small that a pound contains more than a billion billion, researchers have developed a super-strong magnet. Theoretically, this ultra-fine particle iron magnet can be made 10 times stronger than conventional magnets. Experimental magnets have already been made equal to strongest commercial ones now in operation.

Although it will be quite some time before these magnets are commercially available, their development may open up many opportunities to design engineers. The particles can be imbedded in plastics, metal, rubber, or glass. The magnets are easily

Magnet, composed of 10 million billion sub-microscopic particles of ordinary iron, combines strength and versatility, and uses non-strategic material

machined, drilled, tapped, soldered, and molded precisely into any desired shape. Electric instruments that are smaller, lighter, more accurate, and more rugged will be possible.

Because ordinary iron is used in form of submicroscopic elongated particles, strategic metals like nickel and cobalt, used in making most magnets, can be conserved. Elimination of cobalt, which has high induced radio-activity, will permit use of magnets in nuclear reactors.

(Super-strong magnet was developed by Instrument Department and Research Laboratory, General Electric Company, Dept. CP, Schenectady 5, New York.)

Develop lubricating oils that resist radiation . . .

of alkyl aromatic materials plus selenide additives

Lubricating oils that retain fluidity in presence of radiation have been developed through intensive tests. Conventional oils, which tend to solidify under similar conditions, are unacceptable as lubricants in nuclear power plants and other installations where intense radiation atmospheres exist.

In seeking a practical substitute, scientists discovered that aromatic compounds resist radiation better than any other fluids and are preferable as base oil components. They also found that oxidation of organic fluids, accelerated by radiation, can be slowed by selected additive materials containing selenium, sulfur, or iodine.

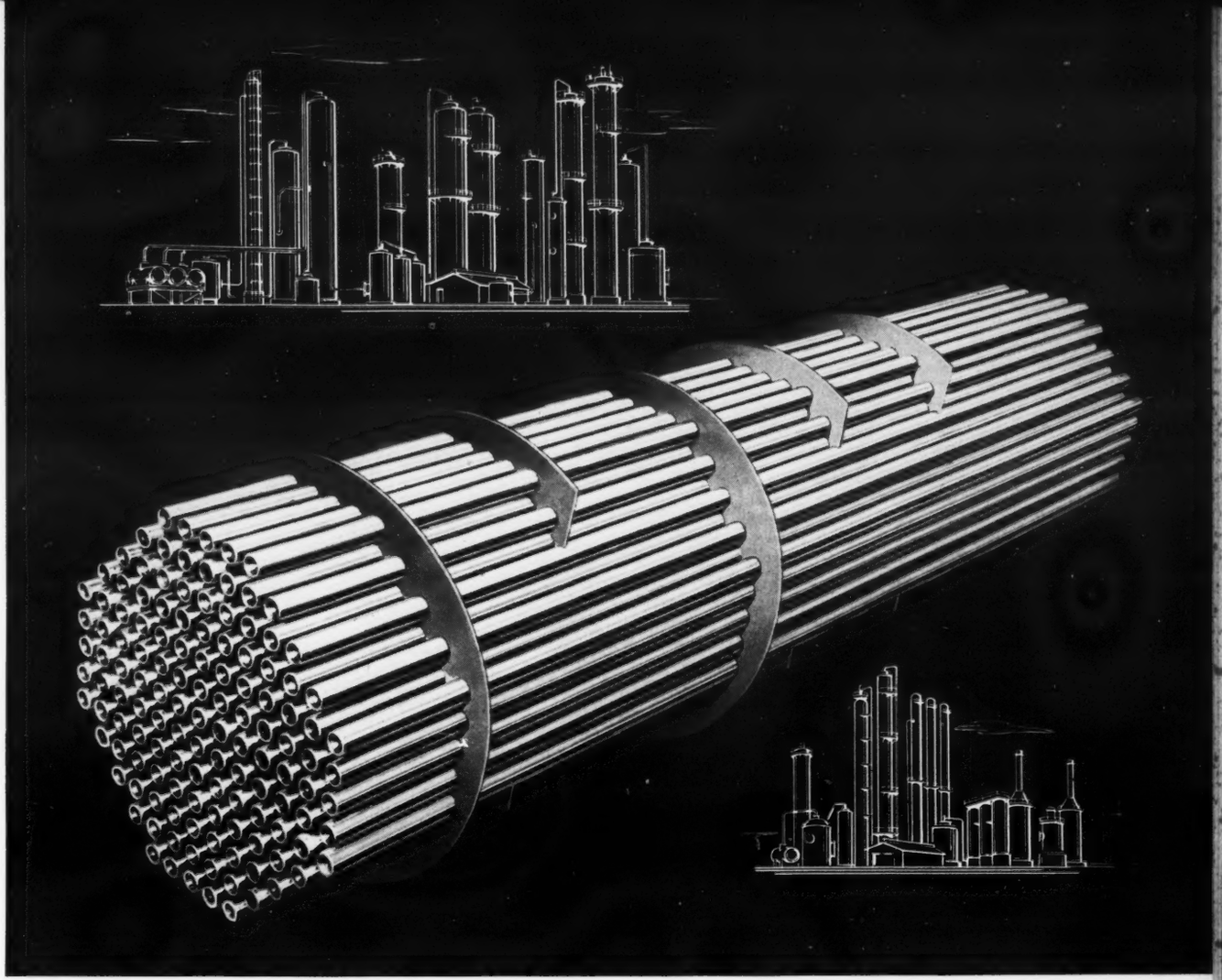
(Radiation - resistant lubricating oils were developed at California Research Corporation, subsidiary of Standard Oil Company of California, Department CP, 225 Bush Street, San Francisco 20, California.)

Predict 10-year reduction in pulpwood growing time

Japanese scientists predict growing time of pulpwood can be reduced by as much as 10 years and wood production increased 30 to 40 percent through use of chemical fertilizers. According to translated 35-page report on Japanese forest fertilization methods, reduction of only five years in tree cropping time may bring an increased profit of $731 an acre.

"Fertilizing Forest Lands" may be obtained from Nitrogen Division, Allied Chemical & Dye Corporation, Department CP, 40 Rector Street, New York 6, New York.

For more information on product at right, specify 3929 . . . see information request blank opposite last page.



YOU SAVE WHEN YOU SPECIFY

B&W ERW Tubing For Heat Transfer Equipment

When you specify B&W Electric-Resistance-Welded Carbon Steel Tubing in your heat transfer equipment, you not only have lower original cost—you are assured of savings where they count—in operating costs. Its uniform wall thickness provides high heat transfer efficiency. And dimensional accuracy from tube to tube assures easier fitting into tube sheets with less time required for rolling-in operations.

Used in oil preheaters and heat exchangers at major refineries, B&W ERW Tubing is made to ASTM and ASME specifications. It must pass rigid inspection and testing standards in manufacture. Its value has been proved in such heat transfer applications as boilers, condensers, preheaters, economizers, evaporators, and refrigeration equipment.

A call to Mr. Tubes, your nearby B&W Tube representative, will bring you economical recommendations plus quick deliveries. Write for Bulletin 412. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA-7008-PP2

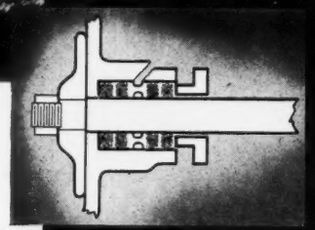
Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels.

MORE OF
THE GARLOCK 2,000

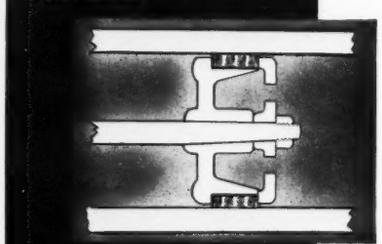
LATTICE-BRAID Packings of pure Teflon fiber for rotating shafts at high peripheral speeds . . . tough, chemically inert, yet resilient for positive sealing and cooler operation under extreme temperature and chemical exposure.

LATTICE-BRAID Asbestos Packing with Teflon impregnation, reduces friction, provides better seal with less gland pressure.

Wherever corrosion, contamination or torque is a problem on reciprocating applications or slow-turning valves CHEVRON Packing made of Teflon is recommended.



Centrifugal pumps handling hot sulfuric acid and petroleum fractions leaked badly with ordinary packing. Also, new shaft sleeve required every few days. Teflon packing reduced leakage, and after several months service both packing and shaft were still in good condition.



Teflon packing rings on duplex pump handling 50% sodium hydroxide at 270 F. showed no sign of wear after 5 months. Formerly, packing lasted average of 30 days.

GARLOCK TEFLON*

Packings Reduce Process Shutdowns

Garlock LATTICE-BRAID† Packings of Teflon reduce maintenance, lower replacement costs, reduce wear on pistons and shafts, and increase productive capacity in countless pump applications where corrosive chemicals and severe operating conditions are encountered. The unique properties of Teflon (chemically inert, heat-resistant, low coefficient of friction, etc.) make it outstanding for use in chemical or petroleum process pump packings.

LATTICE-BRAID Packings of Teflon are another important part of "the Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals to meet all your needs. It's the only complete line. That's why you get *unbiased* recommendations from your Garlock representative. Call him, or write for LATTICE-BRAID Catalog AD 131.

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada. For information on other fluorocarbon plastic products contact United States Gasket Company, Plastics Division of Garlock.

*DuPont Company Trademark †Registered Trademarks

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints, Fluorocarbon Products

IDEAS

Methods improvement idea? Enter contest

Seventh Annual Methods Improvement Contest sponsored by Industrial Management Society will be held in Chicago in conjunction with 21st Anniversary Industrial Engineering and Management Clinic, October 30-31, November 1, 1957.

Industrial plants and companies as well as student groups in colleges and universities are invited to submit entries. Trophies will be awarded for 16 mm films describing "before" and "after" phases of methods improvement projects. Individuals responsible for improvements will be given certificates of merit.

(Rules and regulations for 1957 contest may be obtained from Industrial Management Society, Dept. CP, 35 E. Wacker Dr., Chicago 1, Ill. . . . .or by checking 3930 on form opposite last page.)

Manpower shortage trimmed by educational programs

Survey conducted of engineering and building firms shows that more and more companies are using corporate educational programs to alleviate the shortage of technical personnel. In some cases, this interest takes the form of direct grants and scholarship funds to engineering colleges. Other current programs include part-time jobs for engineering students, financial aid to employes studying engineering, and encouragement of employes to serve as part-time teachers at local engineering schools. Results are based on response from 20 companies, each having from 100 to 1500 engineers on their staff.

(Survey was conducted by National Constructors Association, Dept. CP, 50 East 41st Street, New York, N. Y.)

For more information on product at left, specify 3931 . . . see information request blank opposite last page.

Algae too costly as food source . . .

indicated commercial price would be 48c per lb

Actual pilot plant production experience leads to the conclusion that algae — one-celled plants — will not add materially to our food supply in the foreseeable future. Cost of production is just too high in comparison with conventional crops.

Algae such as Chlorella has frequently been proposed as a means of averting famine in such countries as India. Among advantages cited for Chlorella is that ratio of fats and proteins in this organism can be controlled to some extent by altering the culture medium in which it is grown.

Algae do not grow nearly so fast as do drug-producing molds. To operate a hypothetical algae-producing installation, turning out the product at a rate approximately four times as large as any experimenter has yet achieved on a practical scale, would be 48c a lb. In contrast to this whole ground soy beans now sell for about 6c a lb.

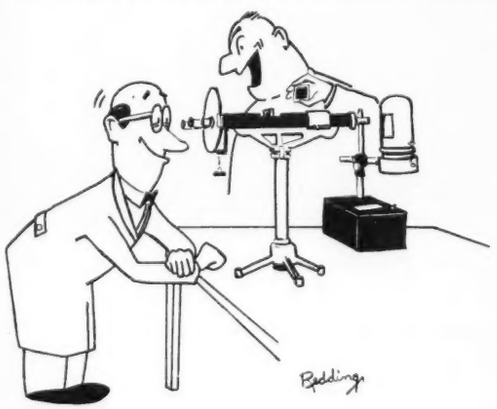
Three things might make mass culture of algae a practical reality:

1) Increase in world population so great as to make new sources of food mandatory regardless of cost.

2) A major research breakthrough.

3) Discovery of some valuable use for algae in addition to use as source of food.

(Summarized from release on research of Dean R. Thacker and Harold Babcock and their experience in pilot plant built by Chas. Pfizer & Co., Inc., Brooklyn, N.Y.)



". . . and here's another picture from my vacation in Miami."

Thanks to James V. Redding, The Central Pharmacal Company, Seymour, Ind.

WHAT BUT A BELT CONVEYOR could carry this load for so few pennies a ton?
Moving at high speed—24 hours a day if required—belt conveyors handle huge tonnages in a continuous stream. Loading and unloading delays are eliminated, and there's no time lost on empty return runs. Operating costs are relatively low, based on cost per ton handled. In fact, economies of belt conveyor operation and upkeep generally top any other form of bulk material transportation. And thanks to their extreme flexibility, installation is easy even in difficult locations.
WHO BUT LINK-BELT offers such a complete belt conveyor service? For any requirement—new installation or modernization job—Link-Belt will plan it, equip it, erect it and stand behind it. Our engineers can choose from industry's most comprehensive idler line—plus a broad range of pulleys, drives, terminal machinery and auxiliary equipment. Because all drawings and equipment come from one source, responsibility is centralized . . . no need to waste valuable engineering man-hours coordinating drawings from several sources.
OVERALL ENGINEERING
COMPLETE EQUIPMENT
SKILLED ERECTION
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Add to the basic economies of belt conveyors the extra advantages offered by Link-Belt—it's a formula producing lower costs per ton for all industry. Your nearby Link-Belt office can furnish complete information. 14,621
LINK-BELT
BELT CONVEYOR EQUIPMENT
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs.

When inquiring check 3932 opposite last page

Research center to be built to study effects of radiation on chemical processes . . .

scheduled for completion by late 1958

Research center for study of radiation effects on products and processes involving plastics, gases, metals, carbons, and chemicals will be built in Sterling Forest, N.Y., approximately 40 miles from New York City. Major facilities will include pool-type reactor, radioactive materials laboratory, ores and engineering laboratory, and building for allied research operations and administrative functions. Completion of research center is scheduled for late 1958 or early 1959. Approximately 150 persons, including scientists, engineers, and metallurgists, will be employed.

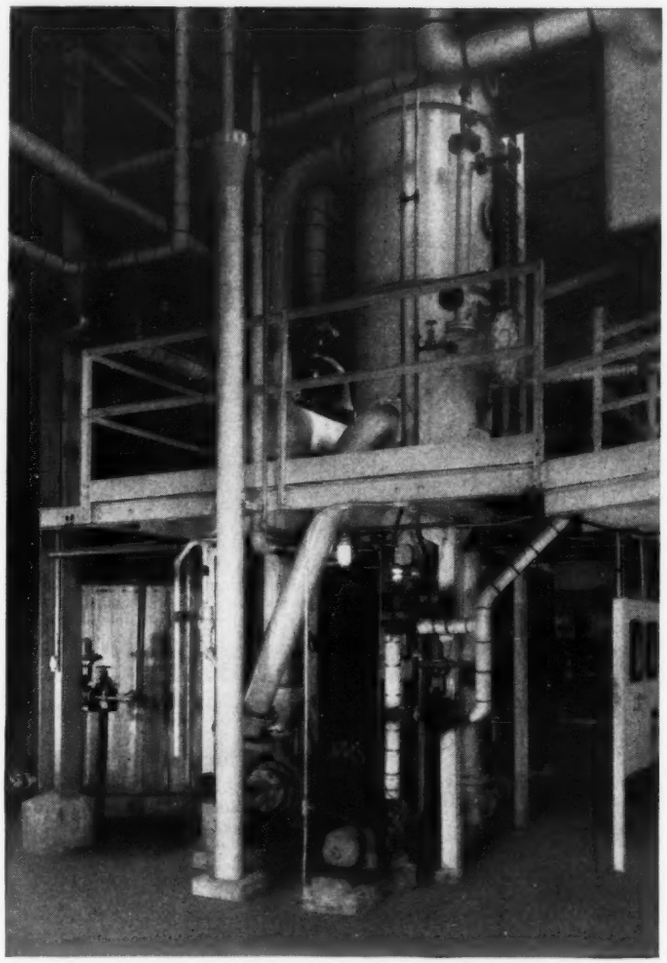
Modified pool-type reactor will be rated at 5 mega-watts of heat energy. Average neutron flux will be 3×10^{13} per cm^2 per second, which means that 30,000 billion neutrons will cross an area of 1 sq cm each second. Twenty-five fuel assemblies will make up reactor. Each assembly will consist of 18 uranium-aluminum plates. These plates are made of layer of uranium-aluminum alloy 20 thousandths of an inch thick, sandwiched between comparable thicknesses of pure aluminum sheathing.

Reactor will rest in grid mounted at base of aluminum tower suspended from bridge over pool. In actual operation, core will be submerged in about 25 ft of demineralized water. Pool enclosure will be made of concrete divided into two bays. Reactor design is such that core can be moved from one bay to another for various requirements in research program.

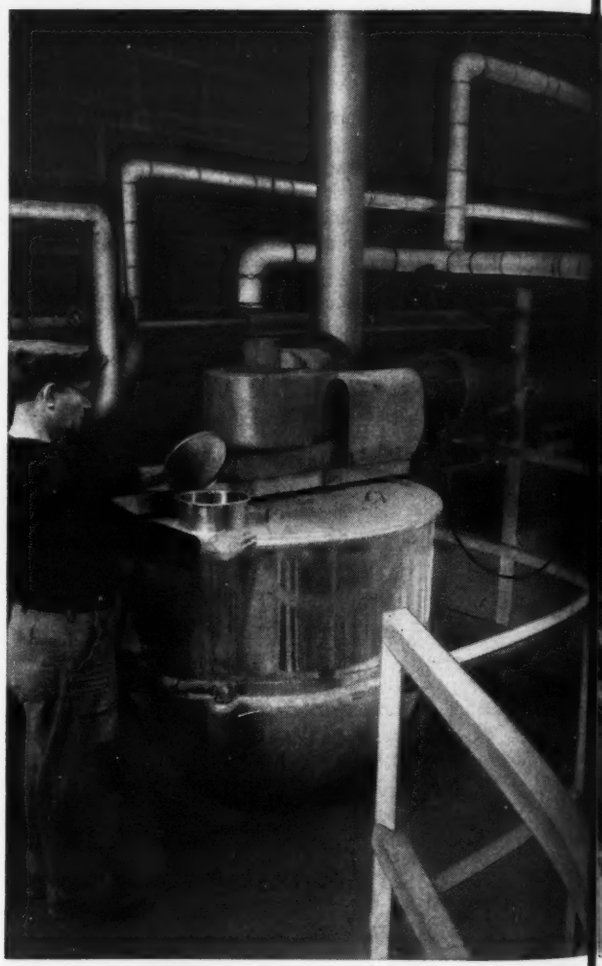
Half of pool, 20 ft square and 30½ ft deep, will be used for large equipment or materials. Nearly two-thirds of reactor building will be carved out of solid granite for a natural shield against radiation. Exposed face of building will be of concrete.

(Nuclear research center will be constructed by Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y.)

"No product with Stainless



Stainless Steel evaporator takes corrosive filtrate from drum filter.



Crystallizer vessel removes last traces of water from product.

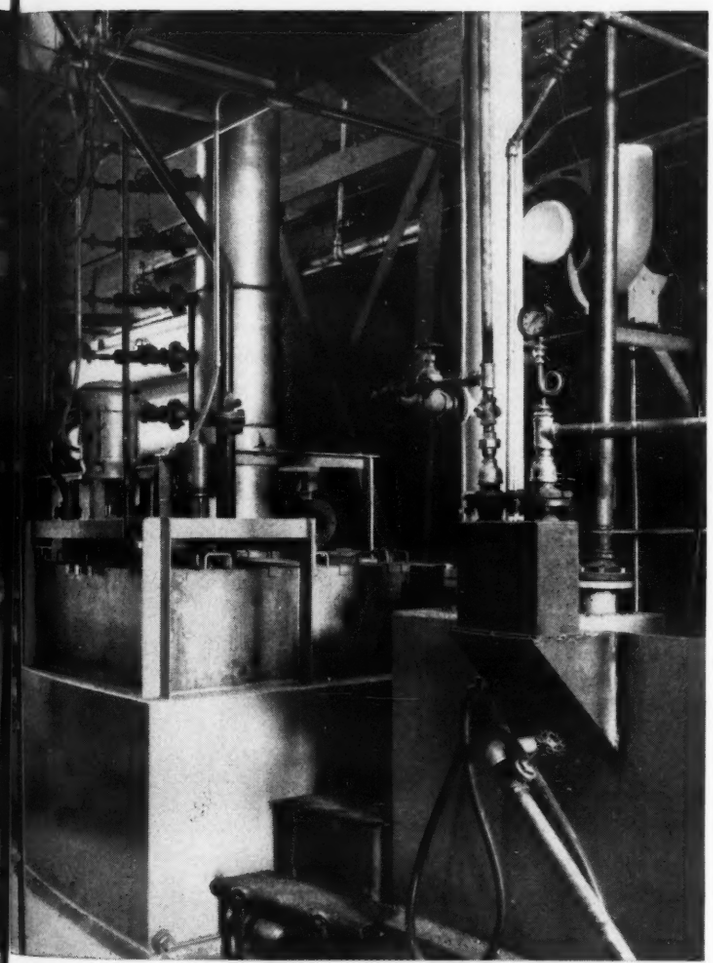
SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

contamination Steel," *says* HOOKER ELECTROCHEMICAL COMPANY

NIAGARA FALLS, NEW YORK



By-product recovery unit condenses vapors from reactor.

The Hooker Electrochemical Company is the country's leading manufacturer of chlorates, perchlorates, and perchloric acid, as well as being the major manufacturer of oxalic acid, phosphorus and phosphorus compounds—all "Oldbury Products." Many of the Oldbury compounds produced are highly corrosive but still must conform to rigid standards of high purity. The use of Stainless Steel has solved many Oldbury production and quality requirements. In phosphorus compounds, Oldbury is the earliest and principal manufacturer of hypophosphites, from which operation these views are taken. According to Hooker Electrochemical: "Stainless Steel effectively prevents product contamination. This is a very important consideration since our reputation is built on a quality product."

If you want to get the very most from Stainless Steel, design with it from the very beginning. And if you want the very best in service-tested quality, specify USS Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK 7-58

USS

UNITED STATES STEEL

When inquiring check 3933 opposite last page

Giant, $2 million plant can operate 16 atom smashers safely at one time . . .

designed to provide maximum level of protection

Van de Graaff and microwave linear accelerators are being manufactured and tested in huge 88,000 sq ft plant located on 50-acre site near Burlington, Mass. It is reported to be largest radiation machine manufacturing and test facility in world. Housed in one-story building, the $2 million plant contains enough radiation test vaults to let 16 high voltage "atom smashers" run simultaneously.

Each vault has been designed to provide maximum level of protection from radiation, both inside and outside plant. Concrete walls 4-ft thick surround each vault, and 20-ton concrete block door is mounted on trucks which ride on specially built-in rails. Doors are 9-ft high, 4-ft thick, and 8-ft wide. As an added measure of protection, huge mounds of earth are piled against exterior of building section where vaults are located.

Exterior construction of building consists mostly of aluminum skin panels, with test vault sections in cast concrete. Movable metal partitions, used inside plant, give high degree of flexibility in adjusting operations to future developments in research, test, and production programs. Flooring is principally of concrete and vinyl tile, with floors in machine shop, sheet metals department, and model shop of wooden blocks.

Diversified power requirements, which exceed 4000 kilowatt hours per day, include 120 volts, single phase; 208 volts, single and three phase; and 480/277 three phase, all working off 13,800 volt main power line. Fifty-cycle power is available for testing machines to be exported. Monorail system runs through machine shop, stock room and paint booth. Tower, 25 ft deep, 40 ft wide, and rising 59 ft above ground, is used for testing large vertical accelerators.

(Plant is owned by High Voltage Engineering Corp., Dept. CP, Burlington, Mass.)

Are you sure you need a flow control system?

Better Check

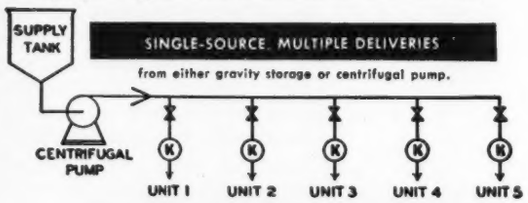
Kates

SINGLE-UNIT

FLOW RATE REGULATORS

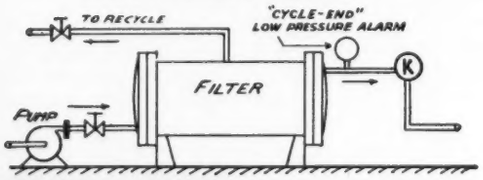
Here's an answer to liquid flow rate control that should appeal to processing, maintenance and accounting men alike. Inlet and outlet piping are the *only* connections; no linkages, control air or electronics are required. Just connect the flow piping and set the desired flow rate; nothing else is required. When inspection or maintenance are necessary, just lift the working parts from the case, which remains in the piping.

KATES direct-acting regulators combine with inexpensive centrifugal pumps or gravity feeds for precision control of blending, liquid circuits, process additives, or coolants—more reliably and at less cost than comparable control systems. Pressure jumps or drops of 125 psi, either upstream or down, are compensated internally—without hunting or lagging. Check over the following typical applications, then write for the entire story.



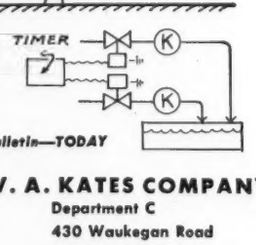
PRESSURE FILTRATION CONTROL

keeps filtration rate at desired point despite steady build-up of filter cake; no valve jockeying!



BATCH PROCESS MEASUREMENT

with nothing more than a timer and solenoid valves feeding through Kates regulators!



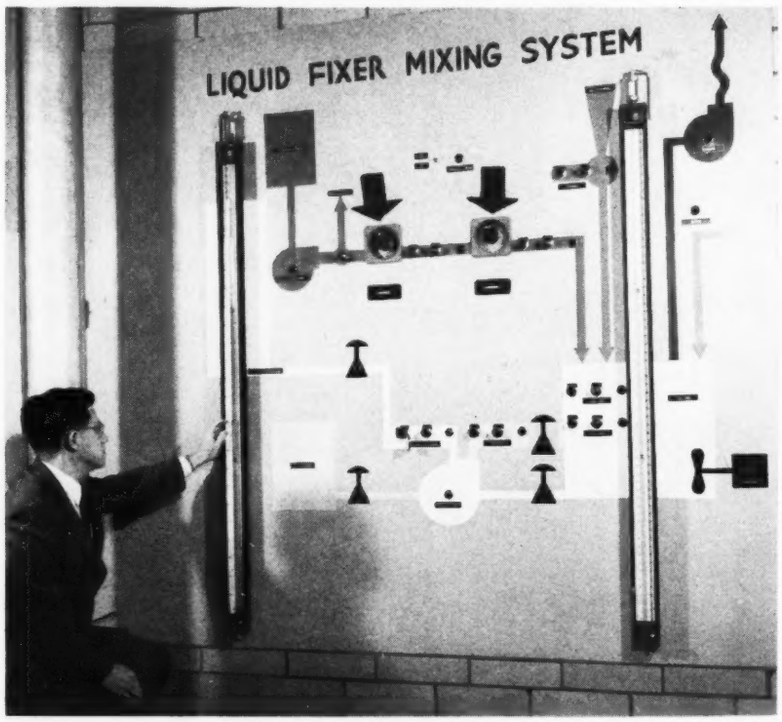
Write for Technical Bulletin—TODAY

Kates | **W. A. KATES COMPANY**
Department C
430 Waukegan Road
Deerfield, Illinois

When inquiring check 3934 opposite last page

Engineering Division of Eastman Kodak Company squeezes a 5500 gallon tank into an already crowded building . . .

"fixer mixer" control system minimizes crowded quarters



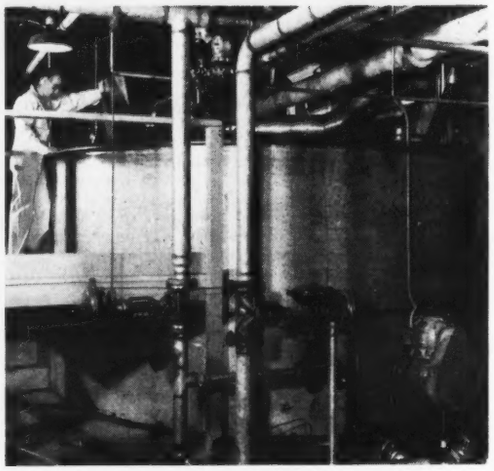
Brain of "fixer-mixer" system is control panel on fourth floor of building. Counters (arrow) control automatic mixing of 5500 gallon batches of photographic fixer in basement agitator tanks

WILLIAM C. CLARKE, Assistant Editor
SAMUEL RUSSELL, Equipment Engineer
Kodak Park, Eastman Kodak Company
Rochester, New York

Problem: Cramped for space, Powder and Solution Department of Eastman Kodak Company had to expand to meet constantly increasing demand for photographic "fixer" solution. Previous expansion programs had used nearly all suitable floor area on third and fourth floors of the building. Suggested expansion even required installation of a 5500 gallon tank causing certain floor loading problems.

Although scarcely a unique problem with today's expansion programs, Eastman engineers also had to devise a control system which would allow maintenance of the same high standards of quality in the new unit as in the small capacity batch system formerly used.

Additional part of the problem was that different formulations of product were required. All types of fixing solutions for photographic processing would be prepared in the expanded facilities. Eastman engineers wanted to design the installation so special equipment, with consequent increased costs, would not be required.



"Mix" tank in basement of Powder and Solution Building. Operator is taking sample for analysis

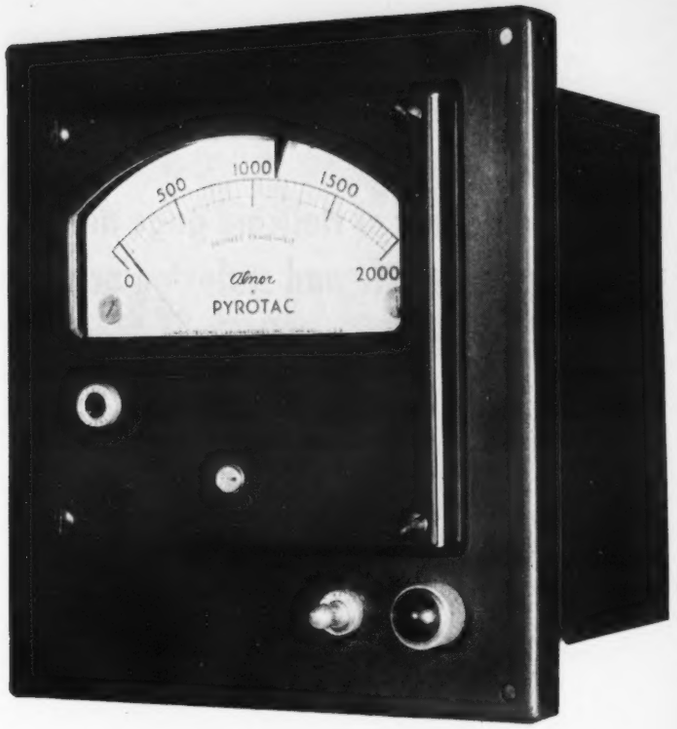
Dumping photographic chemicals into chute for manufacture of fixer

Solution: Eastman engineers designed and built an electrical counter-controlled system for making photographic fixing solution in 5500 gallon batches. Installation is capable of turning out solution ready for bottling only 2½ hours after start of mixing cycle. Equipment is built vertically into four stories of Powder and Solution Building at Kodak Park. Once a starting button is pressed, the "fixer-mixer" is guided automatically through a sequence of steps ranging from the fourth floor solution mixing area to the pumps, filters, and mixing tanks in the basement. Steps in manufacturing process follow a predeter-

Turn to page 93

PYROTAC

LIKE A FUSE



Automatic protection against temperature damage

Just as a fuse protects electrical circuits against overloads, the Alnor Pyrotac automatically protects furnaces, kilns and other heating equipment against damage due to excessive temperatures.

This low-cost, easily installed instrument can be added to any automatic or manually controlled equipment and give continuous protection...safeguard your investment in equipment, controls and material in process.

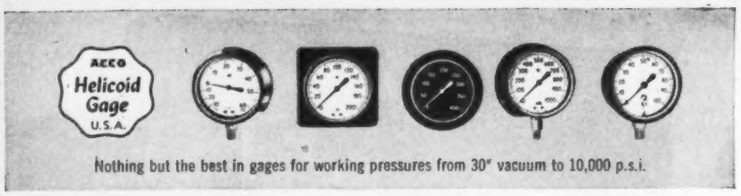
Highest Alnor quality throughout, the Pyrotac features Alnico magnet, double air-gap movement that is standard in all Alnor pyrometers...laboratory precision...industrial ruggedness which assures top reliability.

Write today for complete details on the Pyrotac, available in eight scale ranges from 0-600° F. and 0-3000° F. Ask for Bulletin 2002. Illinois Testing Laboratories, Inc., Room 504, 420 North LaSalle St., Chicago 10, Illinois.

Alnor

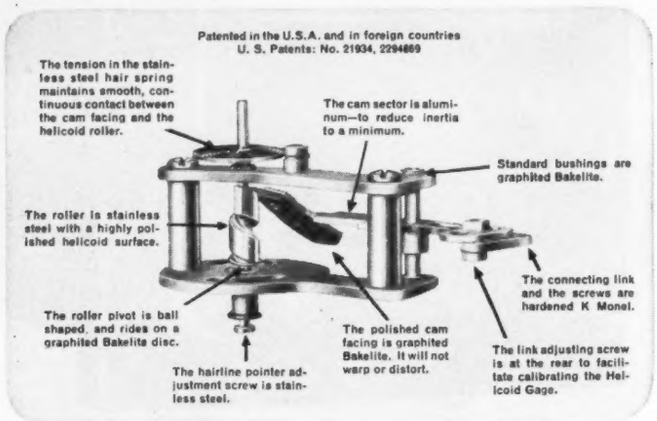
ALNOR PRECISION INSTRUMENTS FOR EVERY INDUSTRY

When inquiring check 3935 opposite last page



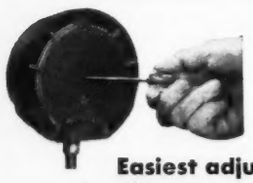
Nothing but the best in gages for working pressures from 30" vacuum to 10,000 p.s.i.

These details of Helicoid gage design assure longer life and enduring accuracy


Patented in the U.S.A. and in foreign countries
U. S. Patents: No. 21934, 2294869
The tension in the stainless steel hair spring maintains smooth, continuous contact between the cam facing and the helicoid roller.
The cam sector is aluminum—to reduce inertia to a minimum.
Standard bushings are graphited Bakelite.
The roller is stainless steel with a highly polished helicoid surface.
The connecting link and the screws are hardened K Monel.
The roller pivot is ball shaped, and rides on a graphited Bakelite disc.
The polished cam facing is graphited Bakelite. It will not warp or distort.
The link adjusting screw is at the rear to facilitate calibrating the Helicoid Gage.
The hairline pointer adjustment screw is stainless steel.

The superiority of Helicoid Gages is most evident in severe service—wherever a gage is subjected to violent pressure pulsations or severe mechanical vibrations.

The *sustained accuracy* of Helicoid Gages over *millions of cycles* is explained by the details of design and construction of the Helicoid movement shown above. Such Helicoid features—protect against wear and corrosion and assure sensitivity, sustained accuracy and trouble-free operation.



Easiest adjustment and calibration

Only Helicoid Gages have the external pointer adjustment pictured here. The Helicoid type adjustment cannot be jarred out of position.

Calibration of Helicoid Gages is accomplished easily, without removing dial or pointer, because the link adjusting screw is at the rear of the system.

Tubes built for millions of pressure pulsations

To fit the wide range of applications, Helicoid Bourdon tubes are available in four materials—alloy steel, K Monel, stainless steel and phosphor bronze.

All Helicoid tubes are made from seamless tubing and are carefully designed to give maximum torque and minimum stress. When used within the dial range, they will withstand many millions of pressure pulsations and will not stretch, leak or crack.

For complete information on the Helicoid line of gages write for **Catalog G-52**

Helicoid gives you all these features at prices that are competitive in the quality gage field.

Helicoid Gage Division
AMERICAN CHAIN & CABLE
929-P Connecticut Avenue • Bridgeport 2, Connecticut

ACCO TRADE MARK

When inquiring check 3936 opposite last page

Operates two switches with remote bulb . . .

bellows is spring-loaded for quick response

Uses: As remote bulb temperature control between limits of −150° and 650°F with off-on differentials of approximately 2°F.

Features: Single remote bulb operates two switches. Control can be used in place of two separate single switch controls.

Single-turn knob sets temperature control point for remote bulb

Description: Complete unit consists of a bulb, capillary tube, bellows, and a control head. Bellows is attached to control head and is connected to remotely-located bulb by capillary tube. Bulb, tube, and bellows are liquid-filled. When heat is applied to bulb, liquid expands and causes motion of bellows plunger.

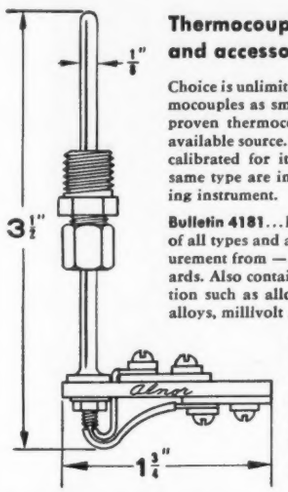
Temperature settings are made by rotating single-turn knob and pointer against calibrated scale. Range spans are either 100° or 200°F. Each switch can be adjusted individually to maximum span of 15°F between switch settings.

Standard capillary tube length is six feet. Any combination of two NC, NO, or double throw switches may be supplied.

(Type E27A temperature control is product of United Electric Controls Company, Dept. CP, 85 School St., Watertown 72, Mass. . . . or for more information check 3937 on form opposite last page.)

Alnor®

pyrometer supplies



Thermocouples, alloy wire, and accessories

Choice is unlimited at Alnor, where you'll find thermocouples as small as ⅛" O.D. and more unique, proven thermocouple designs than at any other available source. Each thermocouple is individually calibrated for its specific application—all of the same type are interchangeable without recalibrating instrument.

Bulletin 4181... lists thermocouples and accessories of all types and alloys for every temperature measurement from —100° F. to 3000° F., to ISA Standards. Also contains complete engineering information such as alloy curves, uses and limitations of alloys, millivolt relationship tables, etc.

Bulletin 4257... lists *surface* temperature thermocouples and accessories available from Alnor.

Circle bulletin number you want, attach this ad to your letterhead and mail to: Illinois Testing Laboratories, Inc., Room 504, 420 N. LaSalle St., Chicago 10, Ill.

Model 3480 small pipeline thermocouple. Precision built to Alnor performance standards. Unit price: $9.00.

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

Alnor

When inquiring check 3938 opposite last page

JERGUSON LARGE CHAMBER GAGES

Transparent type, with non-frosting extension.

. . . the best and most accurate for unusual conditions

Jerguson Large Chamber Gages are specially designed to make possible the most accurate liquid level readings under unusual conditions such as where the liquid boils or surges. Gage chamber is of such large diameter that turbulence is reduced so you don't have to *guess* at liquid level. Also available with a patented frost preventing unit which prevents frost from building up on the vision slot when gaging low temperature, low boiling point liquids . . . or with dual ½" internal heating tubes (unrestricted ¾" side connection) for heavy viscous liquids.

For unusual gaging conditions, investigate the special features of Jerguson Large Chamber Gages. Send for detailed data unit.

JERGUSON

Gages and Valves for the Observation of Liquids and Levels

JERGUSON GAGE & VALVE COMPANY
100 Adams Street, Burlington, Mass.

Offices in Major Cities. In Canada: Peacock Bros. Ltd. In England: Jerguson Tress Gage & Valve Co. In France: Pétrole Service

When inquiring check 3939 opposite last page

"Fixer Mixer"

Starts on page 90

mined sequence according to electrical counter. First, water is measured into a basement tank. Level-sensing device is pneumatic bubbler using compressed air to displace liquid from vertical tube within tank. Air pressure inside bubbler tube actuates pressure switches for automatic switch-off of electrically-driven centrifugal water pumps.

Electrical impulse, initiated by stopping of water pump, causes liquid to be pumped from storage to basement tank. Volumetric positive-displacement meter measures quantity added. Each gallon passing through meter causes counter to be actuated on fourth floor panel board. Counter stops transfer pump and causes pneumatically-operated diaphragm valve to close at a preset quantity.

Since manual handling and proportioning of dry chemicals is simpler and cheaper than remotely-controlled feeder equipment, operator dumps dry components of fixer solution into transfer chute on fourth floor. Rotary valve in bottom of hopper feeds the powders to the chute at a steady rate to prevent jamming of the chute. Rotary valve cannot operate unless mixer on basement tank is running. Control is a centrifugal switch on shaft.

After completion of "mix" time, sample is tested in nearby control laboratory. Approval allows the "mix" to be pumped into a storage tank. Fixer is then ready for bottling.

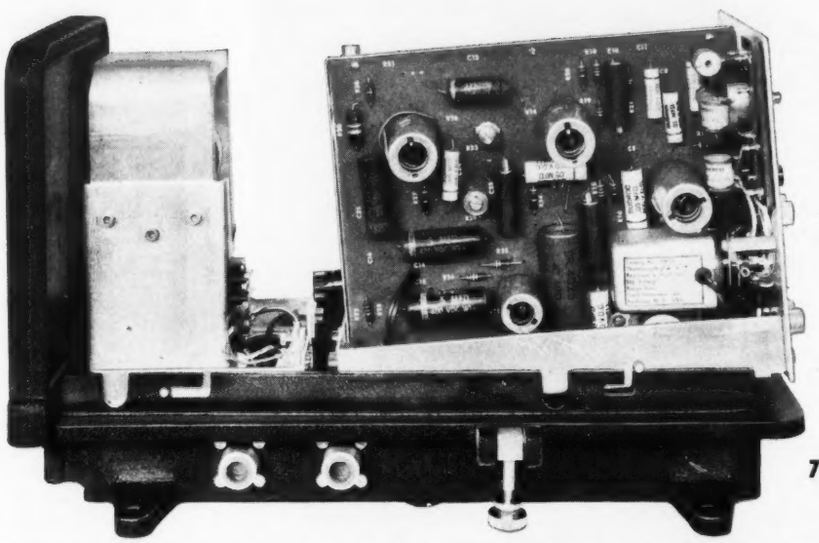
By opening and closing contacts after receiving preset number of electrical impulses, automatic reset counters in "Fixer-Mixer" control panel are primary control elements. Closing a start switch conditions the unit for counting by engaging a clutch. Impulses to count coil are then effective to open the load circuit after preset number of pulses. De-energizing the clutch coil automatically resets unit back to starting position. Dial lock prevents changes in dial settings.

Results: Location of bulky and heavy equipment in basement where soil-bearing floor is capable of carrying heavy loads has meant a most effective utilization of available space for expansion. Even if floor loading had not been a problem, mixing and grinding equipment on upper floors of Powder and Solution Department made it nearly impossible to add any more units.

"Plus" factor in using standard commercially-available instrument components is that maintenance headaches are reduced to a minimum. Replacement parts are easily available. In-plant maintenance requires only that faulty components be replaced even though the "fixer-mixer" system is a "custom" installation. Flexibility of control system allows rapid adjustment of cycle times.

(Electrical reset counter is product of Eagle Signal Company, Dept. CP, 202 20th Street, Moline, Ill. Check 3940 opposite last page.)

5 REASONS WHY A *Taylor* POTENTIOMETER TRANSMITTER WILL DO THE JOB BETTER!



700T Series

Converts any primary electrical signal into a 3-15 psi pneumatic output for controllers and receivers.

1. The unit is continuously standardized automatically. It assures complete electronic balance and permits optimum response adjustments. There are no slide wires, no batteries, no moving parts.

2. Easy continuous adjustment of range span and zero suppression—exclusive Taylor vernier adjustment gives exceptionally fine accuracy in calibration of the unit. You can completely change the range and zero suppression as plant conditions demand—only need one instrument as a spare.

3. Quick, simple removal for service with minimum instrument down-time . . . means that checking can be done efficiently in the shop where full facilities are available.

4. Modern printed circuits insure uniform performance because there's no variation between units. Principal electrical components are identified by engraved numbers on the phenolic board—another simplification for the maintenance technician.

5. Quickly adapted for use for different primary elements because you just plug in the corresponding service "can". "Most ingenious . . . and most practical"—that's what instrument men say about this important addition to the TRANSET* System.

That this ingenious instrument works so well in so many places is another reflection of the years of experience of Taylor instrument engineers in helping solve the problems of the processing industries.

Your Taylor Field Engineer can suggest where a Taylor Potentiometer Transmitter will help you in your processing picture. Write for **Catalog 98262.** Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

*Reg. U.S. Pat. Off.

Taylor Instruments
MEAN
ACCURACY FIRST
VISION · INGENUITY · DEPENDABILITY

When inquiring check 3941 opposite last page

THE MARK OF QUALITY

BARBER COLMAN

Wheelco Instruments

New Series 8000 Multi-point Recorders Feature Easy Reading, Operation, and Service

Swing-out design making all components readily accessible in Series 8000 multi-point recorder is demonstrated below. Cover of recorder mechanism removed to show construction.

Permanent recording of as many as 16 points on one chart — at standard recording speeds ranging from 3 to 24 inches per hour — is readily obtained on Wheelco Series 8000 multi-point recorders. Thermocouples, radiation detectors, and other sensing devices that resolve the measured variable into an electrical signal all work equally well with the new recorders.

Additional features include: up to six limit switches for high and/or low signal indication, single or multi-color printing, and fast cross-chart speed. Call your nearby Wheelco field engineer today for Bulletin F-7955, or to discuss how these multi-point recorders can improve your processing.

BARBER-COLMAN COMPANY

Dept. R, 1520 Rock Street, Rockford, Illinois, U.S.A.

BARBER-COLMAN of CANADA, Ltd., Dept. R, Toronto and Montreal, Canada

Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Electrical Components • Small Motors • Overdoors and Operators Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

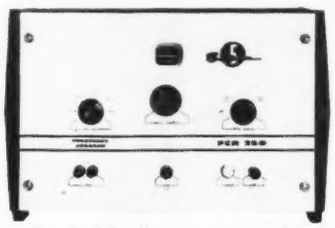
When inquiring check 3942 opposite last page

Need 400 cycle power— for process control or testing . . .

converts 50 or 60 cycle line power with ± 1% regulation

Uses: As portable frequency converter for providing line power in process instrumentation and testing where other than 60 cycle power is desired.

Features: Frequency converter is small and compact and can easily be carried from one location to another.



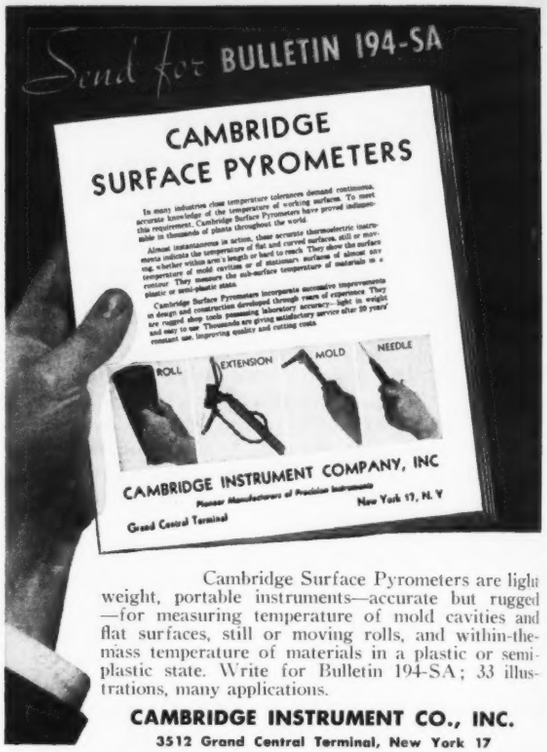
Portable frequency converter converts 60 cycle power

Description: Converter will furnish line power of any desired frequency between 320 and 100 cy with good regulation. With auxiliary frequency standard fixed at 400 cy regulation of ±0.01% is available. Voltage regulation of the unit is held to within ±1%

Converter has input range of 105-125v AC, one-phase, 50-65 cycles. Output voltage range is 115v AC, adjustable 105-125v. Load range is 0-250 va. RF noise suppression has been built into the unit.

(Model FCR 250 frequency converter is product of Sorenson & Company, Inc., Dept. CP, 375 Fairfield Avenue, Stamford, Conn. . . . or for more information about manufacturer's product check 3943 on form which is located opposite last page.)

This month's Processing & Engineering Data section begins on page 216



Cambridge Surface Pyrometers are light weight, portable instruments—accurate but rugged —for measuring temperature of mold cavities and flat surfaces, still or moving rolls, and within-the-mass temperature of materials in a plastic or semi-plastic state. Write for Bulletin 194-SA; 33 illustrations, many applications.

CAMBRIDGE INSTRUMENT CO., INC.

3512 Grand Central Terminal, New York 17

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

When inquiring check 3944 opposite last page

King MANOMETERS

Every Size — for Every Service

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- Double Cleanout
- Double Gland-Packed
- High Pressure

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KC INSTRUMENTS

KING ENGINEERING CORP.

Box 270 • Ann Arbor, Mich.

REPRESENTATIVES IN PRINCIPAL CITIES

When inquiring check 3945 opposite last page

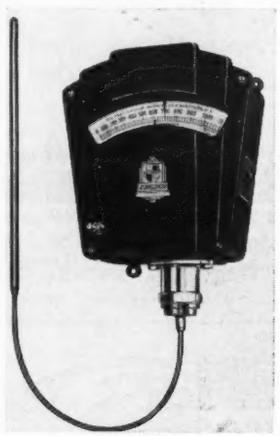
Indicates process temperature and cuts off heat supply when necessary . . .

high-temperature limit control has fail-safe action to protect material being processed

Uses: As limit control switch and temperature indicator for ranges from 0 to 900°F and 0 to 1100°F.

Features: Temperature limit control has fail-safe action for protection of material being processed or equipment being used.

Description: Temperature limit control acts to cut off heat supply if a predetermined temperature, set on calibrated scale, is exceeded. Bulb temperature is indicated on scale at all times. Indicating feature thus gives visual proof that control is in operating condition. Snap-action switch in control circuit requires manual reset. A second switch in series with control switch is normally closed. It will open only if temperature drops below lowest expected ambient temperature. This also provides fail-safe operation, as loss of fill in thermal element will cause a drop in indicated temperature.



Temperature control point of limit controller is easily adjusted

Temperature is indicated by black pointer against calibrated scale. High temperature limit is set with screw-driver adjustment.

(Model HLS Control is product of The Partlow Corporation, Dept. CP, New Hartford, N. Y. Check 3946 on form opposite last page.)

Why no subscription price for this magazine?

You might think it odd that you get CHEMICAL PROCESSING without demand of a formal subscription charge. But it really isn't so strange!

See page 197.

POTTERMETERS®
for any size line
Potter Electronic Flowmetering Systems represent the most modern concept in fluid flow measurement. The POTTERMETER Flow Sensing Element incorporates a hydraulically-positioned, bearingless rotor. Standard POTTERMETERS are available in stainless steel or other non-magnetic material, and can be mounted in any position with a variety of coupling designs.
Widely used in the chemical and process industries, POTTER Flow-metering Systems feature high accuracy throughout a wide range of temperature, pressure, density and viscosity conditions. Unparalleled for applications involving hydrocarbons, corrosive liquids, liquefied gases, gases and various forms of air flow measurement. POTTERMETERS can be supplied with indicating, recording and/or control apparatus, or may be utilized with existing instrumentation.
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STANDARD POTTER EQUIPMENT HANDLES FROM ONE TO 30,000 AND MORE BARRELS OF OIL PER HOUR
POTTER engineered
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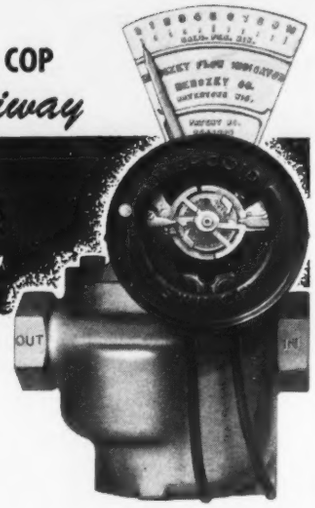
When inquiring check 3947 opposite last page

A FULL TIME TRAFFIC COP
on your fluid hiway

HENSZEY FLOW METERS
with Alarm Control



RINGS A BELL—LIGHTS A LIGHT or ACTIVATES a MOTORIZED VALVE

There are only three moving parts in the HENSZEY FLOW METER — no breakdown due to complicated gears and mechanism. Goes right in the line — no additional supports. Indicates flow within 3% absolute accuracy, even with pulsating flow. Send for bulletin.

SOUND ALARM AT HIGH OR LOW FLOW!

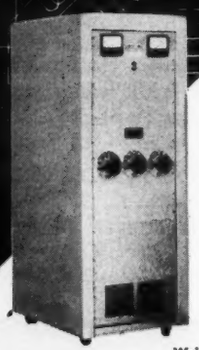
Easy to set on face of switch — unaffected by dust, dirt or corrosion — no pitting or sticking.

HENSZEY COMPANY
DEPT. C WATERTOWN, WISCONSIN

When inquiring check 3948 opposite last page

CUSTOM ENGINEERED RECTIFICATION

priced to compete with ordinary mass-produced equipment!



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RECTIFIERS

Sel-Rex Rectifier users include the country's foremost electrical and electronic concerns* — companies best qualified to evaluate rectifier equipment — who repeatedly specify and install Sel-Rex. Such recognition is not the result of "blue sky thinking" or "gimmick" models or lines...it is the result of delving into cold, hard engineering facts and coming up with the right answers for our customers. Let Sel-Rex custom-design rectification to suit you...it costs no more than ordinary, mass-produced equipment — in the long run, it will cost far less. *Names on request

Write Dept. CP-6

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NUTLEY 10, NEW JERSEY
Offices: Detroit—Chicago—Los Angeles

When inquiring check 3949 opposite last page

Use dental instruments for tight spots . . .

instrument repair shops can extend repair range

Uses: Manipulating, manual sensing, guiding, selecting, assorting — and even lubricating — small instrument parts.

Features: Dental instruments are unit-forged for stamina and ability to withstand day-to-day use.

Dental tools are double-headed

Description: Matched set of three double-headed dental tools represents assortment of pronged shapes that has been successful in varied industrial and mechanical applications.

(Dentools are product of A. Lawrence Karp, Dept. CP, 16 Putnam Park, Greenwich, Conn. . . . or for more information check 3950 on form which is located opposite last page.)

Temperature and pressure pneumatic controllers

Catalog of eight pages describes company's indicating pneumatic controllers for temperature and pressure. Features are listed, and specifications given for both temperature and pressure controllers. Catalog also has section which tells how to order equipment.

Cat C600/700 1 is issued by Industrial Div., Minneapolis-Honeywell Regulator Co., Dept. CP, Wayne and Windrim Aves., Philadelphia 44, Pa. When inquiring specify 3951 on form opposite last page.

Simple
Rugged
Self-Contained

BURGESS-MANNING
Filled-Tube System
TEMPERATURE and PRESSURE Recorder

This completely self-contained, self-actuated recorder is designed to extreme simplicity and features a sturdy, friction-free movement. It requires no adjustment, maintenance or auxiliary power. The inert gas fill of the system is harmless to chemical processing or other applications where mercury and certain vapor tension fills cannot be used. This Burgess-Manning Recorder will give you a new low initial instrument cost combined with long, dependable, maintenance and trouble-free operation. Temperature elements (gas filled) for range of −40° to +800° F. — tubing to 250 ft. Pressure elements available for 0-30 to 0-3000 PSIG.

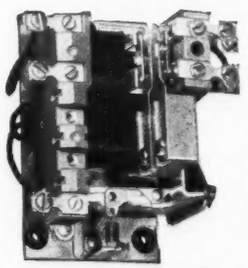
Ask for Bulletin No. 1021

BURGESS-MANNING COMPANY
PENN INSTRUMENTS DIVISION
4126 Haverford Ave., Philadelphia 4, Pennsylvania

Instrumentation and Controls
for water, steam, gases, sewage and industrial wastes

When inquiring check 3952 opposite last page

LIQUID LEVEL **B W** *and INDUSTRIAL*
CONTROLS

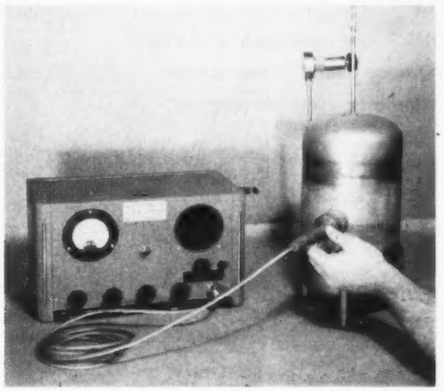


● Write for latest catalog covering the complete line of B/W Induction Relays, Relay Enclosures, Contactors and Starters, Multiple Pump Controls, Electrode Holders, Starter and Relay Combinations, Special Controls and Panels.

B/W CONTROLLER CORPORATION
2204 E. Maple Road, Birmingham, Mich.

FIRST IN THE FLOATLESS CONTROL FIELD

When inquiring check 3953 opposite last page



Sensitive to minute changes

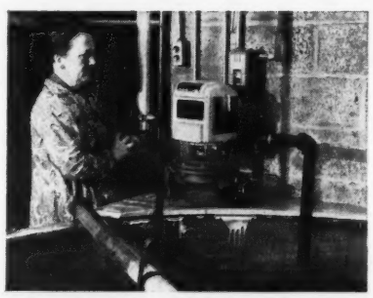
. . . in height, level indicator for liquid-metal operates without an internal probe. Measurements are made through wall. Sensitive to one mm changes in height, indicator is based on a balanced-inductance bridge circuit which can be adapted to different container wall thicknesses by varying the oscillating signal.

(Liquid metal level indicator is product of Nuclear Development Corp. of America, Dept. CP, 5 New Street, White Plains, New York. Check 3954.)

"I'm sorry, my friend, but we're not interested in explosion suppression devices . . . we make perfume."

Thanks to an idea submitted by A. A. Schilling, The Remington Arms Co., Inc., Bridgeport, Conn.

ONLY TWO MOVING PARTS IN THE LIQUID



New Neptune stainless steel meter accurately measures sulfuric acid at Parwel Mfg. Co., Gloversville, N. Y.

Now you can achieve fine-instrument accuracy in the processing of corrosive liquids . . . in batching, blending, transfer, cost accounting, etc. . . . with this new Neptune Stainless Steel Meter.

Also important in processing applications, this Neptune meter ends many problems caused by contamination of liquids measured.

Based on the reliable Neptune positive displacement principal, its accuracy is completely protected from the effects of corrosion or corrosive wear. There are only two moving elements in contact with the liquid. The gear-train is mounted outside the casing, isolated from the liquid.

Available with Direct Reading, Print-O-Meter or Auto-Switch Registers. Size 1½", capacity 100 gpm. with most liquids.

Ask for Bulletin 94/10 N P.

neptune

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When inquiring check 3955 opposite last page

Simplify control problems...

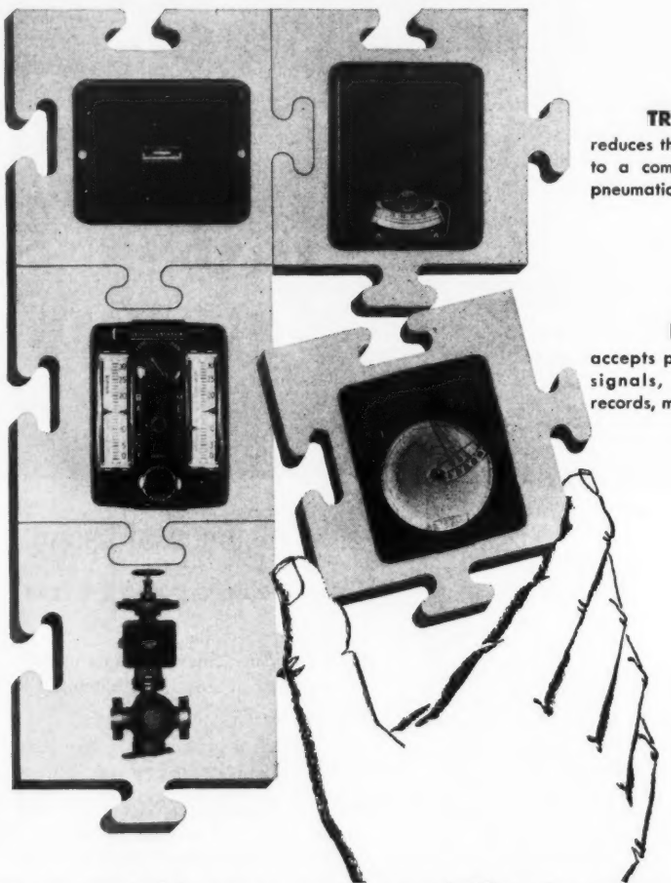
with the Bailey Building Block Method

Control problems are greatly simplified when you attack them using the Bailey Building Block Method. In a nutshell, the method consists of using standard components that fit together like building blocks. Virtually any control requirement can be handled by selecting standard components. Here are the parts you use and the functions they perform.

CONTROL RELAY
takes signals from the transmitter and computes corrective action in terms of pneumatic signals.

SELECTOR STATION
gives operator choice of hand or automatic control including set-point or bias adjustments.

POWER UNIT
is the "muscle" of the system. It performs whatever precise mechanical action is necessary to achieve control.



TRANSMITTER
reduces the measured variable to a common denominator, a pneumatic or electric signal.

RECEIVER
accepts pneumatic or electric signals, indicates and/or records, measurements.

Not all these components are required in every control system. You buy only what *your* system needs. When you change processes or add more automatic control, you can add additional standard components. Sometimes you may want to build a whole new system, re-using some of the existing components and adding other new ones. Spare parts inventory and maintenance training are reduced.

Hear the complete story of the Bailey Building Block System. Find how it can solve your control problems. See your Bailey Engineer or write for more information.

CP-1-1

BAILEY BUILDING BLOCK METHOD

BAILEY METER COMPANY
CHEMICAL AND PETROLEUM DIVISION
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In Canada—Bailey Meter Company Limited, Montreal

RESULTS IN: FLEXIBILITY, SIMPLICITY, ECONOMY

BAILEY METERS

When inquiring check 3956 opposite last page

instrumentation & control

Attack is now being made on problems of process control instrumentation. Accelerated process test program . . .

DEVELOPS GAS CHR

Complete process gas chromatography instrument

Extreme versatility and fundamental simplicity of gas chromatography has caused an accelerated process test program on its use as a production instrument. Design of an elaborate, wide range instrument has seemed premature to analysts until two questions were answered. "How long will a column last?" and "How can column contamination be prevented?"

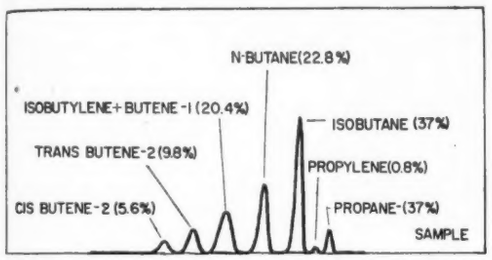
One instrument manufacturer's attack on the problems involves production of an interim gas chromatography instrument. Quantity has been limited to ten units. These are to be placed at various actual plant installations in petroleum and chemical industries to develop a base of experience for design of a more sophisticated production model.

Although the complete story is not yet known — as only seven of the ten units have been set up on problems, tested, and shipped for installation — enough of the program has been completed to say that chromatography can be applied to process conditions.

First problem was to set up reasonable performance specifications for an interim process instrument. Engineers decided that the instrument should be capable of handling a large number of components within a limited ratio of concentration of no more than 100 to 1. Operating temperature of 50°C was selected to avoid severe thermostatting difficulties. Also — only applications were considered for use of instrument in which process stream could be

GAS CHROMATOGRAPHY

as production instrument



Although engineers designed process chromatography instrument for analysis of streams with five components, analyses have been made of gas streams with as many as seven components

sampled entirely in the vapor phase at this temperature.

After reducing total number of components to be analyzed to five, next step of designers was to set reproducibility and stability requirements. These were set at $\pm 1/2\%$ of range in an eight hour period. Data presentation in form of a bar graph was decided, together with means for calibration and carrier to be used, helium. Range of operation over ambient temperatures of $-10°$ to 115°F and up to 95% humidity was required.

Interim Instrument

Consisting of three components, process gas chromatography instrument has been designed to meet performance specifications. Components are: an analyzer, a programmer, and a recorder. Analyzer is essentially an explosion-proof laboratory instrument adapted for plant use. Programmer operates the analyzer by selecting recorder range, and actuating sampling valve.

Instrument has been run on representative programs for periods of one week without requiring attention more than once in an eight hour shift. This attention includes recalibration of peak heights by introduction of a known sample. Accelerated life tests have shown that pneumatic resistance decreases with time but elution times are constant if flow is held constant through combination columns of 25% dimethylsulfolane on firebrick and two meters of Perkin-Elmer B columns.

An object of the program was accomplished with

Turn to page 101

Emery NEWS

WEIGHING SYSTEM

BIN, TANK AND HOPPER EDITION No. 5

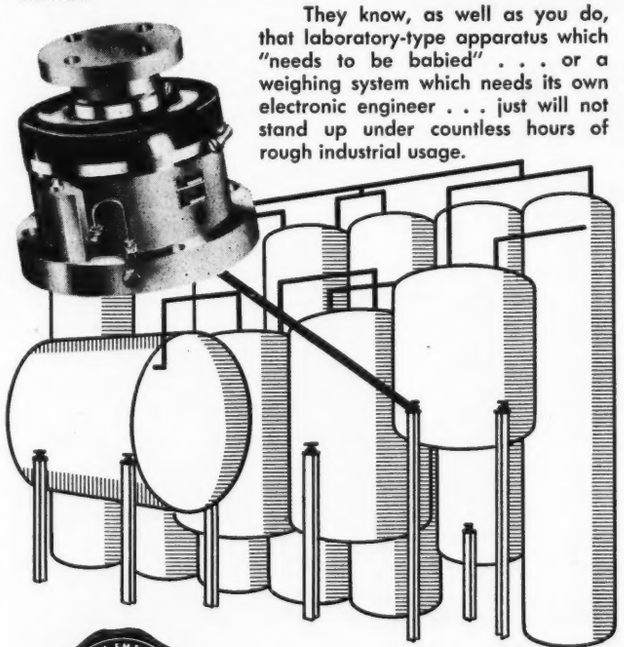
Covering design, development and application data on Emery Weighing Systems for industrial applications

TOP EXECUTIVES FIND EMERY WEIGHING SYSTEMS SUITABLE FOR TOUGHEST WEIGHING APPLICATIONS IN PROCESSING FIELD

Vision And Experience Team Up To Decide On Maintenance-Free Hydraulic Equipment

Men with progressive vision and broad experience in the processing industries are becoming increasingly aware of the need for positive action, extreme accuracy and maintenance-free long service life in the control equipment they buy for their plants. Why? Because in these days of tough "break-even" points and narrow profit margins, they can't afford to take chances.

They know, as well as you do, that laboratory-type apparatus which "needs to be babied" . . . or a weighing system which needs its own electronic engineer . . . just will not stand up under countless hours of rough industrial usage.



The Emery Load Cell is a "husky" piece of industrial equipment which combines years of satisfactory performance with amazing accuracy. A unique design called the "rolling ball" head accommodates reasonable off-center and cross loads. Even though Emery Load Cells utilize hydraulic pressure as a sensitive medium to measure loading they can be teamed with practically any brand or type of instrumentation manufactured today.

There are many good reasons why top executives are specifying Emery Load Cells for their bin, tank and hopper weighing applications. Our new Bulletin 561 describes them in detail. Send for this literature today.

A practical handbook on bin, tank and hopper weighing and the instrumentation involved. Write for it now!

PRECISION SINCE 1872 — THE A. H. EMERY CO. — FORCE MEASUREMENT

THE A. H. EMERY COMPANY

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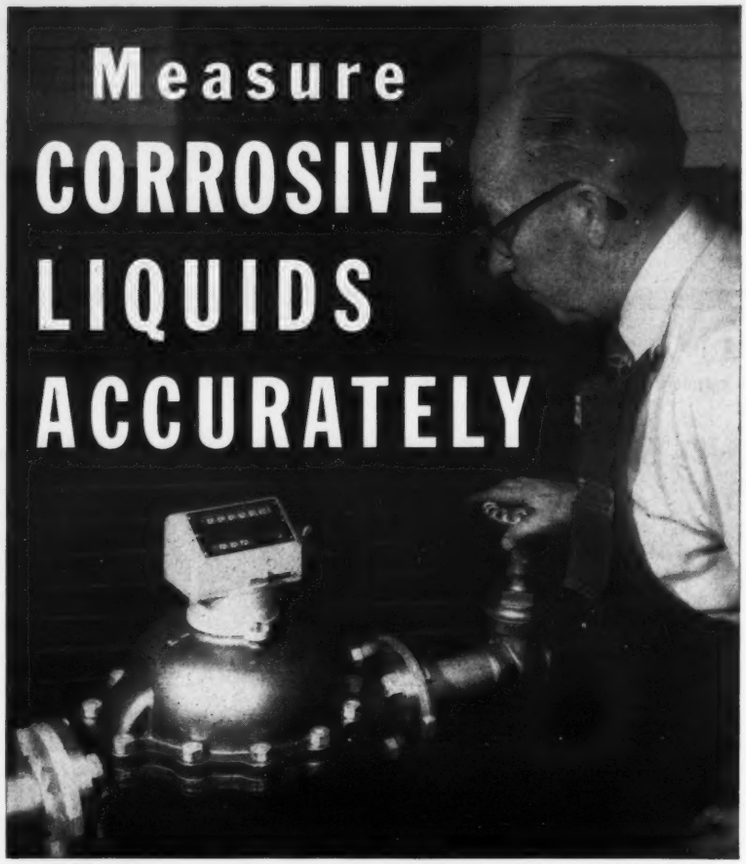
When inquiring check 3957 opposite last page



with NIAGARA Displacement Meters

Now you can apply the extreme accuracy of Niagara Meters to the measurement of corrosive liquids. Niagara Chemical Meters of Type 316 stainless steel offer good resistance to corrosion and can be used to measure caustic soda, most acids, fruit juices and similar liquids. Available in sizes 3 to 110 G.P.M. or in intermittent use up to 160 G.P.M. Niagara Chemical Meters are also available for automatic liquid measurement and liquid flow control in hazardous or non-hazardous atmospheres.

If you have corrosive liquid metering problems, let us help you. Mail coupon today.

BUFFALO METER CO.

2892 Main Street

BUFFALO 14, NEW YORK

Please send me information on the complete line of Niagara Meters.

Liquid.....

Flow g.p.m..... Temp.....°F

Name.....

Company.....

Address.....

When inquiring check 3958 opposite last page

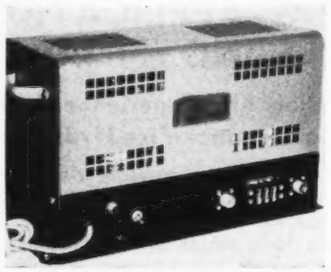
Converts output signal of turbine flowmeters to usable form . . .

provides either analog or digital output

Uses: As transient converter for one with turbine flowmeters.

Features: Converter has plug-in units for easy maintenance. Either analog or digital output is possible.

Description: Transient converter accepts a sinusoidal input signal of varying frequency from



Transient converter will feed data to computer from flowmeter

turbine flowmeter. Output is analog output for recorders and oscillographs or a digital output to counters and computers.

Input frequency range is from 0 to 600 cycles per second, operating from a 500 ohm source impedance. Output is 0 to 100 mv analog signal or a 10v positive pulse (at eight times input frequency).

Unit has a short term analog accuracy and linearity of ±0.5%, and a long term accuracy of ±3%. Rise time is 10 milliseconds for a 40 to 600 cps step.

(Transient converter is product of Fischer & Porter Co., Dept. CP, 950 Jacksonville Road, Hatboro, Pa. Check 3959 on form opposite last page.)

This month's Processing & Engineering Data section begins on page 216

ASKANIA

Positive Displacement Transometers

For Measuring, Controlling, Indicating, Integrating Flows of Fuel Oils, Viscous Liquids and other Liquids.

The Askania Transometer is a Positive Displacement Flow Meter that also sends a pneumatic signal for flow indication, recording and controlling functions.

Positive Displacement spells the difference between conventional flow meters and the Askania Transometer. Positive Displacement is the ONLY means for accurate measurement under ALL conditions of flow. Even changes in viscosity, pressure or temperature have no effect upon Transometer accuracy.

Write for bulletin 301 to Askania Regulator Company, 242 East Ontario Street, Chicago 11, Illinois.

ASKANIA REGULATOR COMPANY

"CONTROLS FOR INDUSTRY"

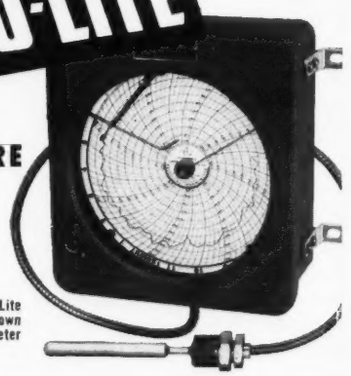
HYDRAULIC, ELECTRONIC CONTROLS & SERVOS, GENERAL SYSTEMS, ENGINEERING & COMPUTER SERVICE, VALVE ACTUATORS & CYLINDERS

A SUBSIDIARY OF GPE

When inquiring check 3960 opposite last page

AUTO-LITE

. . . for TEMPERATURE RECORDING



One of the many uses for Auto-Lite Recorders is the application shown below . . . a natural gas field meter run.

Auto-Lite Model "1000" Temperature Recorder has 6" chart. Various standard ranges from minus 40° F to plus 550° F. Available for wall mounting, portable or portable self contained use. Electric or mechanical chart drive. Choice of 24-hr. or 7-day cycle. Capillary tubing permits remote reading. Priced as low as $49.50. Manufactured to customers' specifications. Send for latest Catalog describing many types of Auto-Lite Recorders and Indicators.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

TEMPERATURE RECORDERS & INDICATORS

When inquiring check 3961 opposite last page

Gas Chromatography

Starts on page 98

completion of the preliminary data-gathering. Problems and needs associated with process application of gas chromatography have been studied and background on them has been obtained, sufficient to specify and build a production instrument.

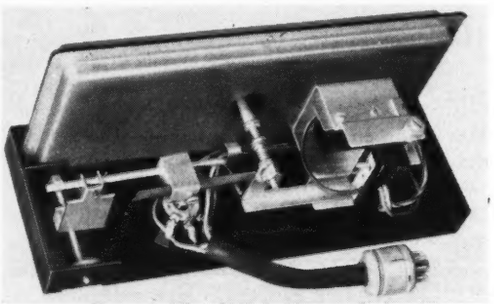
(Information was taken from technical paper presented at Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy. Authors are C. C. Helms and S. Norem, Perkin-Elmer Corporation, Norwalk, Conn. For more information check 3962.)

Stabilizes draft control systems by eliminating "hunting"

Uses: As draft controller to eliminate instability and "hunting" by automatic draft control systems.

Features: Fluctuations and pulsations of furnace are filtered out of control system by proportional band controller *without* sacrificing resolution sensitivity.

Description: Heart of draft controller is of flat beryllium spring with controlled characteristics. One end of spring is attached to diaphragm

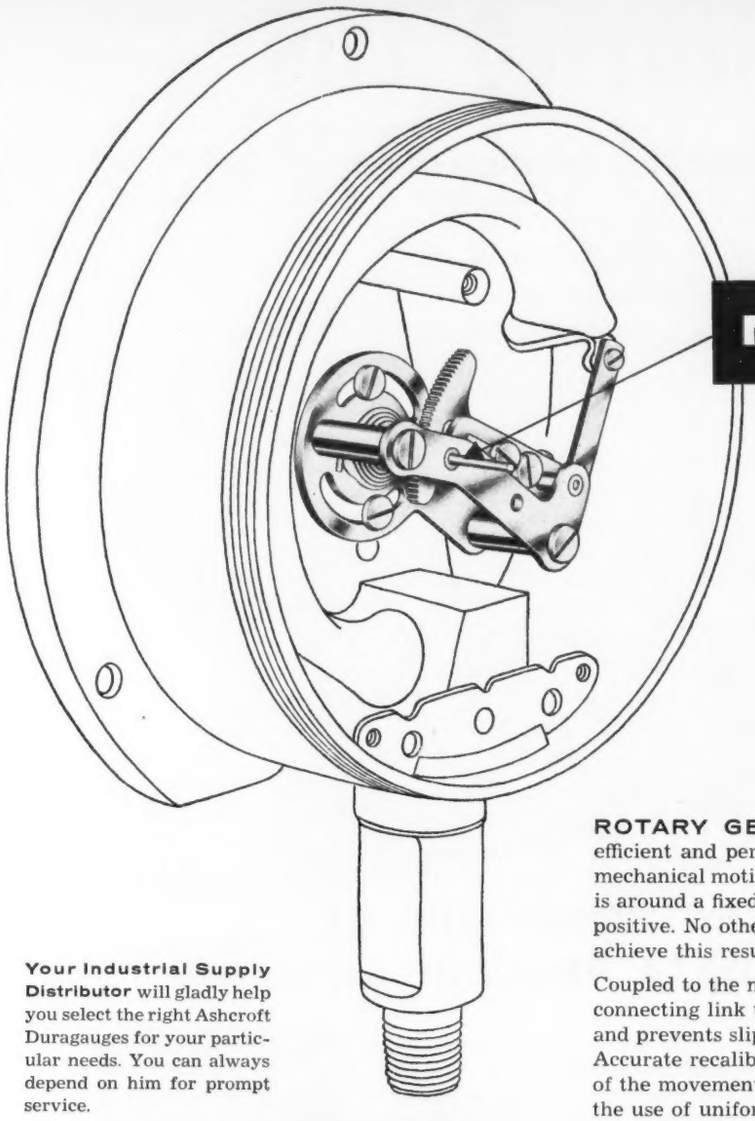


Proportional band controller can be adjusted to maintain draft set point desired

assembly to oppose force exerted by furnace pressure. By varying force which spring exerts on diaphragm, set point can be selected for operation over entire range of control. Width of proportional band is varied by increasing or decreasing effective length of spring. Once adjusted, controller will maintain a pre-determined over-fire furnace pressure, positive or negative with respect to atmosphere.

Instrument has been designed for small industrial power plants. Controller adjustment is factory pre-set. Unit is housed in metal case for protection.

(Proportional band controller is product of Cleveland Fuel Equipment Company, Dept. CP, 1111 Brookpark Road, Cleveland 9, Ohio . . . or for more information check 3963 on form opp. last page.)



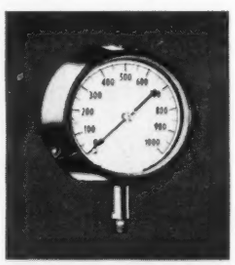
Why does the MOVEMENT in the ASHCROFT DURAGAUGE outperform all other types?

Your Industrial Supply Distributor will gladly help you select the right Ashcroft Duragauges for your particular needs. You can always depend on him for prompt service.

ROTARY GEARED MOTION, the most efficient and perfect method of transmitting mechanical motion ever developed. Because rotation is around a fixed center, pointer position is always positive. No other type of movement can ever achieve this result.

Coupled to the movement is a one-piece connecting link that guarantees correct calibration and prevents slippage or parting under tension. Accurate recalibration is easy from front or rear of the movement. Universal adjustability permits the use of uniformly graduated dials, thereby facilitating maintenance.

The Ashcroft Duragauge is available with all-stainless-steel movement or stainless steel with nylon bearings and pinion gear. There are case designs and materials, Bourdon tube materials, pressure ranges and dial sizes to meet your service conditions exactly. Save time, trouble and money. Specify the pressure gauges of highest sustained accuracy and durability – Ashcroft Duragauges.



1850 ASHCROFT U.S.A

MAXWELL MANNING & MOORE INC. TRADE MARK

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario*

ASHCROFT GAUGES

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

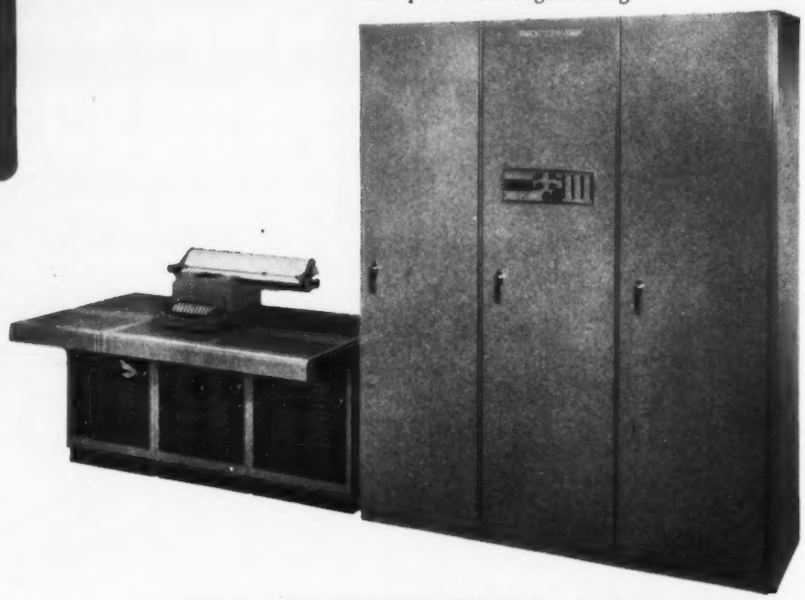
MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, *Stratford, Conn.* 'HANCOCK' VALVES, *Watertown, Mass.* 'CONSOLIDATED' SAFETY RELIEF VALVES, *Tulsa, Oklahoma.* AIRCRAFT CONTROL PRODUCTS, *Danbury & Stratford, Conn. and Inglewood, Calif.* "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, *Muskegon, Mich.*

When inquiring check 3965 opposite last page

KYBERNETES

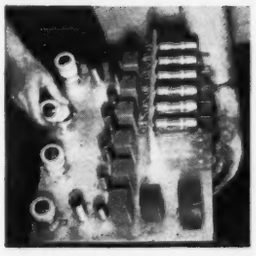
THE KYBERNETES CORPORATION

Division of Self Winding Clock Company, Inc.
for 70 years leader in time standards
and precision engineering



ALL ELECTRONIC LINE OF AUTOMATIC DATA PROCESS LOGGERS

A revolutionary engineering concept, the
Kybernetes Electronic Data Logger
puts to use designs largely predicated
upon advanced techniques
developed by the computer industries,
featuring reliability and accuracy.



KYBERNETES

Write for Bulletin '108'

THE KYBERNETES CORPORATION

Executive Offices:
9 East 40th Street
New York 16, N. Y.
MUrray Hill 3-6030

When inquiring check 3966 opposite last page

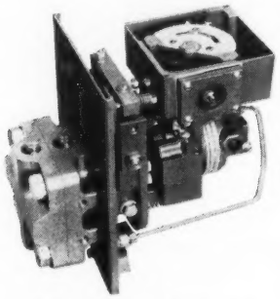
Pneumatic transmitter adjusts incrementally

Null-balance-vector design permits 20-to-1 adjustment without changing parts

Uses: For pneumatic transmission of differential pressures over continuously adjustable range from 0-15″ water to 0-300″ water.

Features: Differential pressure transmitter can be adjusted over a wide range (20-to-1) without changing of parts or zero settings.

Description: Differential pressure transmitter is one of two transmitters utilizing null-balance-vector design principle. Second model transmits pressure. Both models permit stepless changing of each instrument's range. Standard models of both instruments operate on 20 psi air and produce output signals from 3 to 15 psi, normally using about 0.2 scfm of air.



Differential diaphragm of pressure transmitter is lower left. Range adjustment is at upper right

Specifications on differential pressure transmitter include an over-range protection of 1500 psi on either side of diaphragm and a static pressure rating of 1500 psi. Standard diaphragm material is coated nylon fabric. Pressure seal bellows is 316 stainless steel. Weight is 28 pounds.

(Type VDP differential pressure transmitter is product of Republic Flow Meters Company, Dept. CP, 2240 Diversey Parkway, Chicago 47, Ill. . . . or for more information check 3967 on form which is located opposite last page.)

Permits plug-in assembly of digital systems . . .

transistorized building blocks can be combined to perform all digital operations

Uses: Computer building blocks for data handling, logical analysis, simulation, control systems.

Features: Complete digital systems can be built up by combining "building blocks" to perform arithmetic computation, storage, programming, and logical decision.

Description: Plug-in units are basic components of digital system. Computers can be designed, con-

Complete computer control systems can be built by simple connection of basic package units

structed, maintained, and operated from simplified block diagrams. Units are transistorized to reduce size and power requirements. Operations are determined by manner in which different basic packages are inter-connected.

(M-PACs are product of Computer Control Company, Inc., Dept. CP, 92 Broad Street, Wellesley 57, Mass. . . . or check 3968 opposite last page.)

"Surely when they said you must wear your safety suit at all times they meant ON THE JOB!"

Dirt, Corrosion, Low Voltage Problems?

the answer:

Allis-Chalmers "dc operated" ac contactors*

Allis-Chalmers Size 6 starter, NEMA 1 enclosure.

Dc operators in Allis-Chalmers control assure dependable performance because they are not affected by dirt or corrosion on the armature face. Positive magnetic operation reduces contact pitting — eliminates hum and chatter—prolongs mechanical life. The operator picks up at 65% of rated voltage — holds in with as little as 35%.

For Any Low Voltage, High Horsepower Application . . . Allis-Chalmers Modern Control — Sizes 4, 5 and 6

Advanced Electrical Design

ACBO arc-centering blowout sharply curtails arcing time, greatly prolongs contact and chute life — without blowout coils.

Simplified Mechanical Design

Streamlined clapper-type construction permits natural arc rise in arc chute. Sensible enclosure dimensions provide ample wiring space. Easy accessibility simplifies maintenance.

For detailed information on this complete line of modern control, call your A-C Control Distributor or A-C District Office. Or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

*Self-contained ac to dc circuit. Standard in Size 6, optional in sizes 4 and 5.

ALLIS-CHALMERS

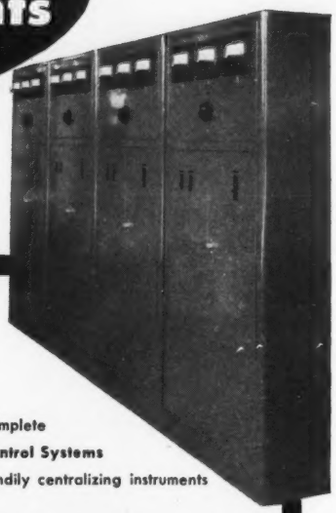
A-C ALLIS-CHALMERS A5372

ACBO is an Allis-Chalmers trademark.

When inquiring check 3969 opposite last page

Apart from a full line of Temperature CONTROLLERS

users have proved *these* instruments by WEST



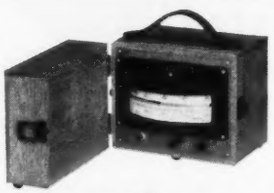
MODEL | SERIES

High Resistance indicating pyrometers

Complete **Control Systems** handily centralizing instruments

MODEL RT SERIES

Resistance Thermometer indicators (and controllers)



MODEL IE SERIES

Portable high resistance indicators

MODEL IN SERIES

Multi-Point indicators with TC switches

MODEL M SERIES

tubeless electronic potentiometer strip chart **Recorder**

WEST *Instrument* **CORPORATION**

SALES OFFICES IN PRINCIPAL CITIES

4357C W. MONTROSE, CHICAGO 41, ILL.

British Plant: WEST INSTRUMENT LTD. 52 Regent St., Brighton 1, Sussex

Represented in Canada by Upton, Bradeen & James

For data on these or controller instruments, use your classified phone directory or write direct.

the trend is to **WEST**

When inquiring check 3970 opposite last page

Replaces manual control of precipitators . . .

automatic feedback control of electrostatic cleaners

Uses: As completely automatic feedback control to replace complexities, inefficiencies of manual operation of electrostatic precipitators.

Features: Electrostatic control system continuously monitors and readjusts itself to maintain optimum operating conditions despite changes in temperature, flow rate, composition, humidity of gas, size and resistivity of particles.

Electrostatic control unit is self-contained

Description: Instrument will operate gas cleaning system continuously around-the-clock at maximum collection efficiency. Unit operates by controlling high voltage input to precipitator, voltage, and sparking conditions with ideal, preset reference levels. These are determined by experimentation with both precipitator and process. Control assembly electronically monitors variations between reference and actual conditions.

(Control assembly for CA system is product of Research-Cottrell, Inc., Dept. CP, Bound Brook, New Jersey. Check 3971 opposite last page.)

Controlling, feeding, metering equipment listed

Manufacturer's line of equipment for metering, chemical feeding and proportioning, and controlling processes and operations is listed in 12-page bulletin. Index summarizes functions of equipment, and brief descriptions outline uses.

Bul 5 is issued by B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence 1, R. I. When inquiring specify 3972 on form opposite last page.

MARSH *Mastergauge*

The gauge that has everything!

- **LEAK-PROOF ONE-PIECE CONSTRUCTION** . . . bourdon tube fused to socket and tip by exclusive "Conoweld" process.
- **STURDY "MARSHALLOY" CASE** . . . formed of boiler-plate-thickness steel, copper clad inside and outside to give it the corrosion resistance of solid copper. It's one third lighter, but four times stronger than cast iron.
- **PRECISION "MASTERGAUGE" MOVEMENT** . . . with such exclusive features as the coined sector gear.
- **AVAILABLE WITH STAINLESS TUBE AND SOCKET** . . . choice of stainless steels and alloys for all corrosive conditions.
- **WITH "RECALIBRATOR"** . . . quickest and best way to keep a gauge accurate.

These features are combined only in "Mastergauge", standard bearer for the broad line of Marsh Gauges . . . each the best of its kind. Ask for data.

MARSH "THE STANDARD OF ACCURACY"

MARSH INSTRUMENT CO., *Sales Affiliate of Jas. P. Marsh Corp.*, Dept. Z, Skokie, Ill.

Marsh Instrument and Valve Co. (Canada) Ltd. 8407 103rd St., Edmonton, Alberta.

Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas.

When inquiring check 3973 opposite last page

Lumenite

AUTOMATIC CONTROLS

ELECTRONIC LIQUID LEVEL
INDUSTRIAL TIMERS
TIME SWITCHES
MAGNETIC SWITCHES

Ask for Bulletin

FL—Liquid Level
FM—Milk Level
FN—Nonconductive Liquid
ITC—Ice Thickness
BH—Boiler Level

Ask for Bulletin

LT—Time Switches
PC—Program Clocks
CR—Cycle Repeaters
R—Time Delay Relay
RMC—Automatic Reset

Lumenite Electronic Company

ENGINEERS DESIGNERS MANUFACTURERS

407 S. Dearborn Street Chicago 5, Ill

When inquiring check 3974 opposite last page

Indicating pressure transmitter has accuracy of ±½ percent of scale range . . .

transmitter eliminates need for separate field gage with eccentric indicating scale

Uses: As pneumatic transmitter for process pressure measurements, transmitting a 3-15 psi signal to indicating, recording, or controlling instruments.

Features: Transmitter has a built-in eccentric indicating scale to eliminate the need for a separate field gage.

Description: Indicating pressure transmitter has accuracy to ±½ percent of scale range. It measures pressures of 0-30 inches of water to 0-6000 psi, with standard pressure elements — spirals, helicals, bellows, and diaphragms. Element materials are available for corrosive process fluids. Indicating scale is 4⅛ inches long.

Pressure transmitter has indicating scale

Mounting can be wall-surface or on vertical pipe. Output and 20 psi air supply connections are ¼ NPSF. Measurement connection is ¼ or ½ NPT, depending on pressure range. Transmitter is 8⅛" high, 5⅞" wide, and 4⅛" deep. Weight is eight pounds.

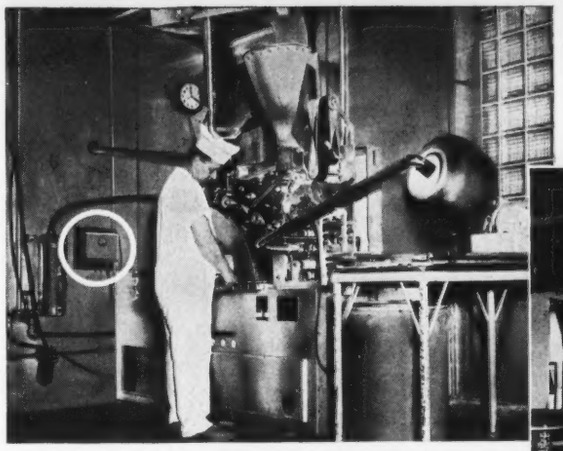
(Model 44 pressure transmitter is product of The Foxboro Company, Dept. CP, Foxboro, Mass. . . . or for more information check 3975 on form opposite last page.)

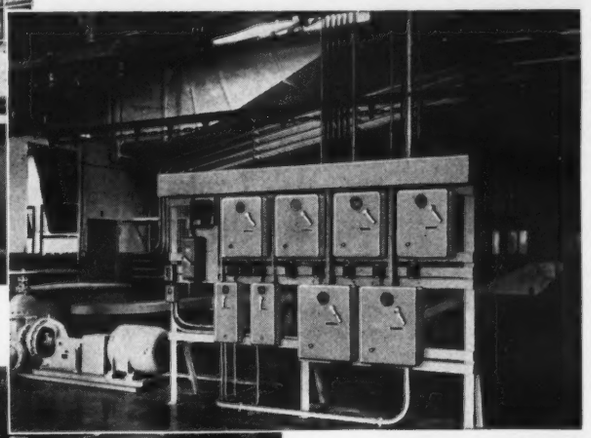
Is it strange

. . . that you should receive a magazine such as CHEMICAL PROCESSING without being subjected to the "formality" of a token subscription payment?

Not at all! For reasons why . . .

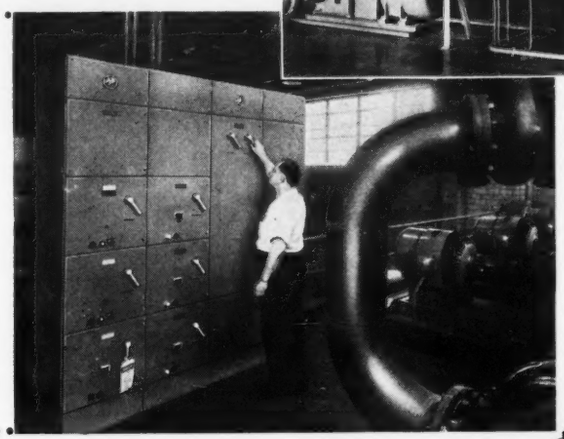
. . . see page 197.

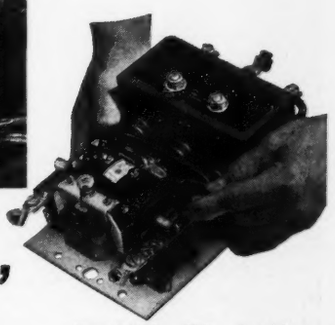

◀ Encapsulating machine, in pharmaceutical plant, equipped with Allen-Bradley automatic starter.


Allen-Bradley combination starters on spray booth control in large automobile plant. ▶

The Sign of QUALITY CONTROL

A-B Quality


◀ Allen-Bradley multi-unit control in large New Jersey brewery for controlling operation of pumps.


The Bulletin 709 solenoid starter—with only ONE moving part—assures millions of trouble free operations.

Special controls are "standard" with the Allen-Bradley line!

The Allen-Bradley line comprises hundreds of "standard" controls which are really "specials". . . in other words, they are designed for specific jobs. They may have explosion-proof or watertight enclosures, or they may be combined with a manual disconnect, or with a circuit breaker. They may consist of individual units, or be grouped together in an Allen-Bradley multi-unit control board.

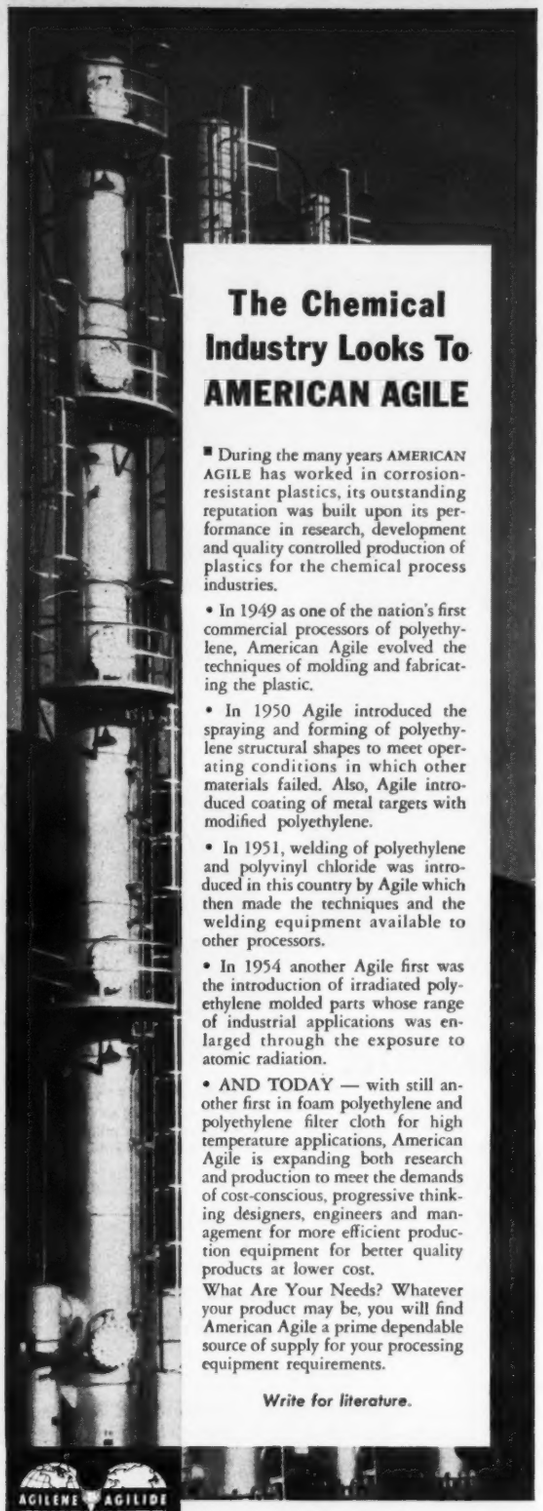
The Allen-Bradley line is so extensive that almost any special motor control problem can be quickly solved with standard catalogued units.

You should have the Allen-Bradley Handy Catalog on your desk . . . a 132-page encyclopedia of motor control data. Write, today.

Allen-Bradley Co.
104 W. Greenfield Ave., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY

When inquiring check 3976 opposite last page



The Chemical Industry Looks To AMERICAN AGILE

■ During the many years AMERICAN AGILE has worked in corrosion-resistant plastics, its outstanding reputation was built upon its performance in research, development and quality controlled production of plastics for the chemical process industries.

• In 1949 as one of the nation's first commercial processors of polyethylene, American Agile evolved the techniques of molding and fabricating the plastic.

• In 1950 Agile introduced the spraying and forming of polyethylene structural shapes to meet operating conditions in which other materials failed. Also, Agile introduced coating of metal targets with modified polyethylene.

• In 1951, welding of polyethylene and polyvinyl chloride was introduced in this country by Agile which then made the techniques and the welding equipment available to other processors.

• In 1954 another Agile first was the introduction of irradiated polyethylene molded parts whose range of industrial applications was enlarged through the exposure to atomic radiation.

• AND TODAY — with still another first in foam polyethylene and polyethylene filter cloth for high temperature applications, American Agile is expanding both research and production to meet the demands of cost-conscious, progressive thinking designers, engineers and management for more efficient production equipment for better quality products at lower cost.

What Are Your Needs? Whatever your product may be, you will find American Agile a prime dependable source of supply for your processing equipment requirements.

Write for literature.

AGILENE AGILIDE

Established in 1932

AMERICAN AGILE CORPORATION

5461 Dunham Road • Maple Heights, Ohio

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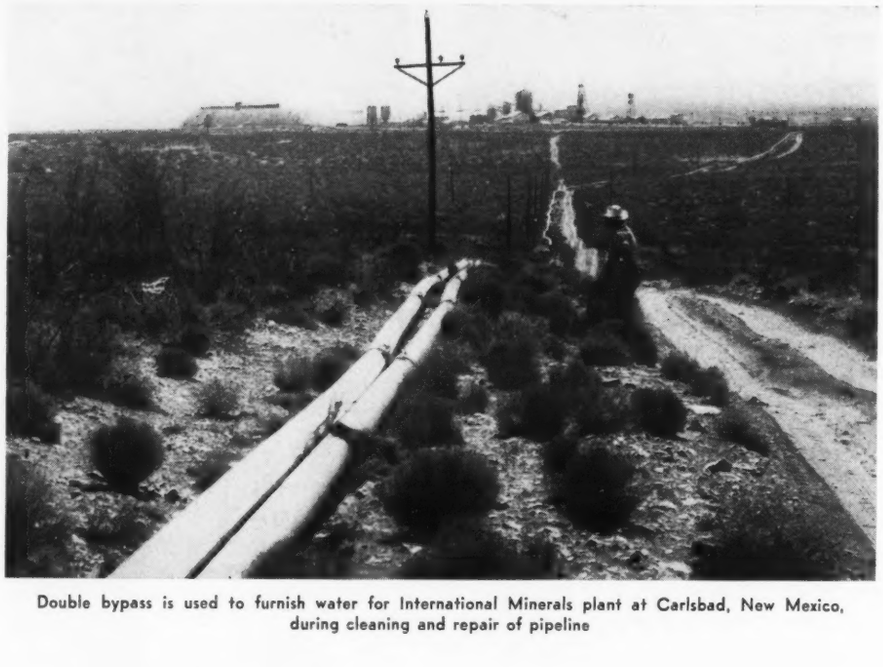


Double bypass is used to furnish water for International Minerals plant at Carlsbad, New Mexico, during cleaning and repair of pipeline

International Minerals' 19-mile water line was corroded and clogged with scale. Here's how problem was solved at a cost far under that of a new line, with throughput increased by one-fourth and power costs for pumping lowered

one-coat epoxy coating system restores interior of water line

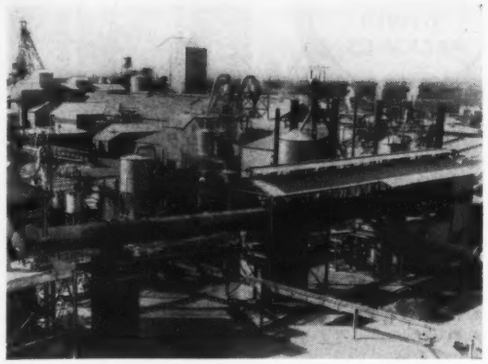
R. H. DURST, Project Manager
W. A. SEEDORFF, JR., Project Engineer
International Minerals & Chemical Corporation
Potash Division, Carlsbad, New Mexico
With **CP Staff**

Problem: The 19-mile water supply line for the Carlsbad, New Mexico, plant of International Minerals was so corroded with scale in the summer of 1956 that either cleaning and corrosion protection measures had to be taken or complete replacement of line might be necessary. Water is obtained from two deep wells for transportation to the plant through the pipeline, which is buried two to four feet below ground.

The water supply line, originally placed in service in 1948, consists of nearly all 14″-diameter pipe. By 1953 scale had built up in pipe so that a booster pump was installed to meet flow requirements. Scale build-up actually reduced line to less than the equivalent of a 10″ pipe.

Water is used for processing operations. Plant produces magnesium oxide, refined potassium chloride, muriate of potash, Sul-Po-Mag® (sulfate of potash magnesia), potassium sulfate, sodium chloride, and hydrochloric acid.

Processing is a continuous operation, which requires about 2000 gpm of water. Plant cannot store more than a three- to four-hour supply of water. Hence,



Processing is a continuous operation at the plant, requiring about 2000 gpm of water

water line could not be cut for even half a day without stopping all operations at the plant. International Minerals did not want to lose production by shutting off water lines long enough to make repairs. Replacement of entire line would cost about $750,000.

Solution: In the summer of 1956 the line was cleaned, repaired, and coated with an epoxy-base catalytic-setting coating. Water flow was never interrupted because a by-pass arrangement kept the water moving.

For the bypass, a double line of 8″ flexible-joint aluminum in quick-coupling 40′ sections was used.

A three-way Stopple system diverted water through the bypass. Up to 12,500′ of water line could be cleaned and coated at one time with this arrangement.

Line has built-in obstacles to cleaning and coating. It is spiral-weld pipe with welded joints of modified bell-and-spigot design. Overlap and offset made such joints hard to clean thoroughly and hard to coat.

Turn to page 113

Plug is lubricated with coating before inserting it in pipeline

Recommended reading for CHEMICAL ENGINEERS

In the pages of this Painting Manual are data every maintenance engineer will want to have when faced with problems involving protective coatings.

How to save time and money in surface preparation; how to secure good adhesion with vinyl-based top coatings; how many top coats to provide effective protection against a given corrosive; common spraying problems and how to remedy them.

Primarily, of course, the Manual deals with the Tygon series of protective coatings—the protective coatings developed specifically to meet severe corrosion problems.

Detailed data on the characteristics of the various Tygon coatings; where and how to use them; complete tables of chemicals to which the coatings are resistant; these and other helpful data are yours in this free manual.

Write for it today.
Ask for the Tygon Painting Manual.

343E

Plastics & Synthetics Division

U. S. STONEWARE
AKRON 9, OHIO

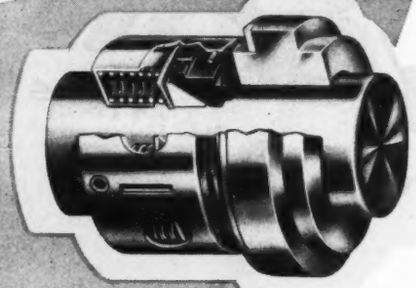
When inquiring check 3978 opposite last page

ACIDS, CORROSIVES AND SOLVENTS

HOT LIQUIDS

TOXIC GASES AND VAPORS

JOHN CRANE



TYPE 9 MECHANICAL SEAL

WILL HANDLE THEM ALL!

Wedge and sealing rings molded from DuPont Teflon assure efficient, safe handling of all known industrial chemicals and corrosives at temperatures varying from −120°F. to +500°F. Spring and metal parts are furnished in the metallurgical specification best suited to the particular service. In every way, you get a mechanical seal that is "John Crane" engineered to your requirements—no matter how tough!

The Type 9 Seal has and continues to solve innumerable problems where difficult-to-handle liquids and gases are involved . . . at pressures up to 750 psi. It can do the same for you.

Use the Type 9 Seal on all rotating shaft equipment—centrifugal and rotary pumps, mixers, agitators, autoclaves, other equipment.

REMEMBER: ***Your toughest problem can be the Type 9's next success story.*** **Send for full details today.**

Crane Packing Co., 6421 Oakton St., Morton Grove, Ill., (Chicago Suburb). *In Canada: Crane Packing Co., Ltd., Hamilton, Ont.*

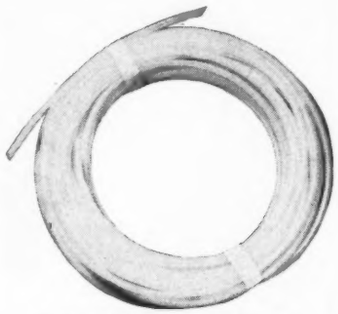
JOHN CRANE CRANE PACKING COMPANY 38 YEARS INDUSTRIAL PROGRESS

When inquiring check 3979 opposite last page

For rugged applications — polyethylene tubing . . .

available in translucent or black, sizes ¼ to 1"

Uses: Polyethylene tubing is designed for applications in chemical, pharmaceutical, and food processing operations. It is safe for drinking water use. It is not recommended for uses involving exposure to continuous sunlight.



Plastic tubing is available in sizes from ¼ to 1"

Features: Tubing has excellent resistance to corrosion.

Description: Polyethylene is available in sizes from ¼ to 1" in translucent and plain black. Standard coil lengths are 100 and 500'.

(Dur-X polyethylene tubing is product of Franklin Plastics, Inc., Dept. CP, Franklin, Pa. . . . or for more information check 3980 opposite last page.)

Bulletin summarizes story of glass-protected steel

Development of glass-protected steel to provide corrosion-resistance is summarized in four-page bulletin. Explanation tells what product is, why it was developed, and how broad its effective range is. Chemical and physical properties are listed.

Bul MQ-101 is issued by A. O. Smith Corp., Dept. CP, Milwaukee 1, Wis. When inquiring specify 3981 on form opposite last page.

Specify KNOX TOWER PACKINGS

PORCELAIN

SINGLE-PARTITION RING

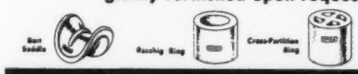
Save Time and Money on

KNOX Tower Packings

for Initial Installations as well as Replacements, because

- Uniform Quality
- Zero Porosity
- Iron Free
- Resists High Temperature, Fumes, Vapors, Corrosion, Alkalies and Acids
- High Strength
- KNOX produces porcelain Tower Packings from same composition as is used for High Voltage Electrical Porcelain

Further information, prices and samples gladly furnished upon request.



KNOX PORCELAIN CORP.
KNOXVILLE 1, TENNESSEE

When inquiring check 3982 opposite last page

A NEW DEGREE OF RESISTANCE TO CHEMICAL CORROSION

Tropoxies

Protect wood, metal and masonry surfaces

On "problem" surfaces, where chemical fumes or liquids quickly break down ordinary paints, new Tropoxy enamels provide superior, longer-lasting protection. These new epoxy-resin coatings effectively retard chemical corrosion on exterior metal, wood, concrete, plaster, brick, cement or cinder block. Multiple coats can be applied within hours to achieve ideal 5-mil thickness.

FREE! Complete information on these superior corrosion-resistant coatings sent on request. Write today!

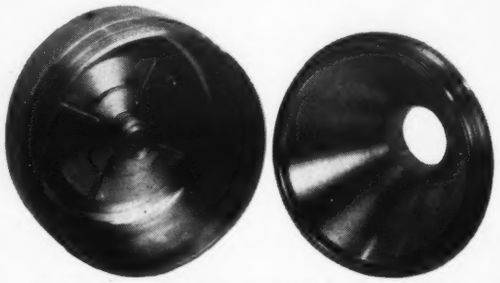
TROPICAL PAINT COMPANY
1128-1266 W. 70th, Cleveland 2, Ohio
HEAVY-DUTY MAINTENANCE PAINTS SINCE 1883 • SUBSIDIARY OF PARKER RUST PROOF COMPANY

When inquiring check 3983 opposite last page

First titanium centrifuge ready for testing with chlorides . . .

lower density of titanium permits higher speed with same working stress

World's first titanium centrifuge has been manufactured and will soon be placed under tests with corrosive chloride solutions which frequently cause failures of conventional metals. Besides the factors of corrosion resistance, test program calls for an evaluation of the mechanical and design advantages of titanium. In terms of mechanics, the stress in a high-speed rotating bowl is governed by the centrifugal force, which is, in turn, influenced by the mass or weight of the moving parts. Since titanium weighs only 56% of much as the metal commonly used in centrifuges, the lower density permits a 28% increase in velocity for the same working stress.



Bowl and cover of titanium centrifuge after finishing

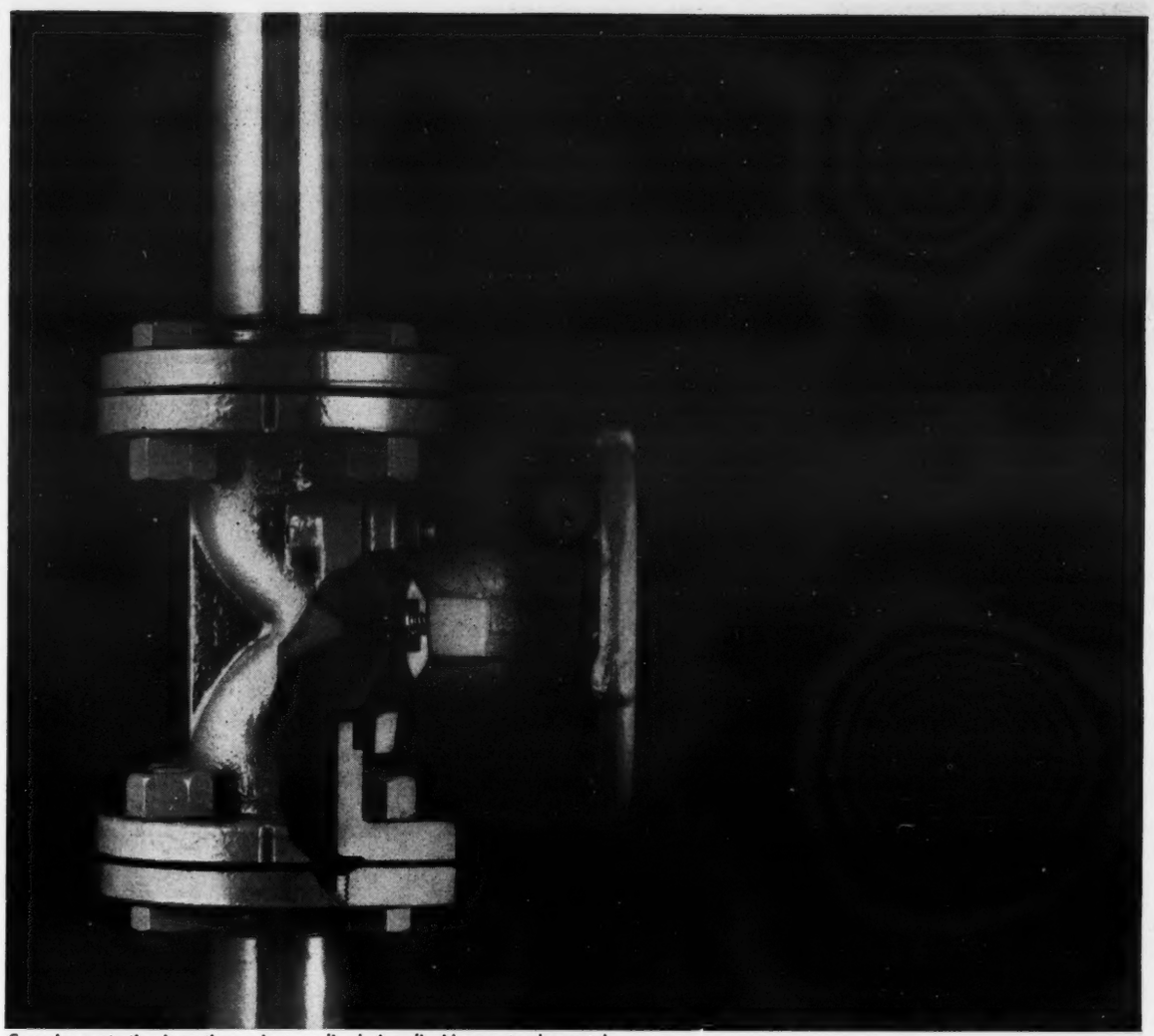
(For further information on titanium used in centrifuge, contact Rem-Cru Titanium Inc., Dept. CP, Midland, Pa. . . . or for more information check 3984 on form opposite last page.)

(For further information on titanium centrifuge contact The DeLaval Separator Co., Dept. CP, Poughkeepsie, N.Y. . . . or check 3985 on form opposite last page.)

Convenient guide helps determine aluminum corrosion resistance

As an aid to engineers using aluminum in process plants or equipment, handy six-page guide tells at a glance the yearly corrosion rate of more than 100 chemicals and other materials on aluminum. Guide points out that proper use of aluminum can reduce annual $6 billion loss caused American industry by corrosion.

"Corrosion Keys for Aluminum" is issued by Reynolds Metals Co., Dept. CP, 2500 S. Third St., Louisville, Ky. When inquiring specify 3986 on the convenient Reader Service slip which is located opposite last page.



Corrosion protection is continuous in saran lined pipe—liquid never touches metal.

You can see why Saran lined pipe prevents corrosion

Corrosive liquids never touch the rigid steel pipe . . . it's lined with durable saran

You can stop downtime and other corrosion-caused losses by using saran lined pipe.

The saran liner, over which is swaged a steel pipe, gives complete protection from commonly used acids, alkalies and many other corrosive liquids. At no time do these liquids touch the rigid steel pipe, its fittings or valves.

You'll like the labor-saving way it fabricates. Cutting and threading can be done in the field with conventional hand or power tools. And you can hang it in the same manner as ordinary steel pipe.

Saran lined pipe has high bursting strength, withstanding working pressures up to 300 psi. Fittings and valves are available in cast iron or malleable iron for 150 psi working pressures and in cast steel for 300 psi working pressures.

For tomorrow's protection today, investigate saran lined pipe. THE DOW CHEMICAL COMPANY, Midland, Michigan.

SARAN LINED PIPE COMPANY
DEPT. SP1593B
2415 BURDETTE AVENUE
FERNDALE 20, MICHIGAN

Please send me information on saran lined pipe, fittings and valves.

Name_____ Title_____ Company_____

Address_____ City_____ State_____

YOU CAN DEPEND ON DOW

When inquiring check 3987 opposite last page

no one coat does it...

one source does

Valdura offers maintenance paints made from specific resins for every condition

EPON

VAL-CHEM. Versatile, chemical resistant metal primer for use under any finish coat. VALPON ENAMEL. Prevents damage by oils, solvents, alkalies and other chemicals on wood, metal or masonry.

PARLON

PARAVAL ENAMEL. Not affected by acids, alkalies and other chemicals. Used on wood, metal, concrete or masonry. RUBBER BASE ENAMEL. Combines excellent exterior durability with high chemical resistance.

BAKELITE

SUPER SERVICE ENAMEL. Resists chemical, moisture and abrasive conditions on metal wood or masonry. ASPHALT ALUMINUM PAINT. 98% waterproof metal coat prevents rust, rot, corrosion. Highest reflectivity.

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SEWAGE DISPOSAL BLACKS. Used for protecting concrete and metal surfaces from water, etc., found in sewage plants, reclamation projects, refrigeration systems, metal and concrete pipe, marine exposures.

URETHANE

URAVAL. The very latest type of coating that combines the ultimate in resistance to chemicals, solvents, marring and abrasion. Uraval will stand up where all other types of coating have failed.

ALKYD

M & F ENAMEL (General Maintenance), VALKOTE (Implement Enamel), DARYWHITE. Products that utilize the outstanding durability of alkyd resins. All these coatings are hard, tough, quick drying and color retentive.

Write today on your regular letterhead for FREE catalog on all Valdura maintenance paints.

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VALDURA
HEAVY DUTY PAINT DIVISION
AMERICAN-MARIETTA CO.
101 E. Ontario St., Chicago 11, Ill.
687 Wellington St., Ottawa, Canada

When inquiring check 3988 opposite last page

Rubber-lined check valve available in small sizes of 1 to 1½" . . .

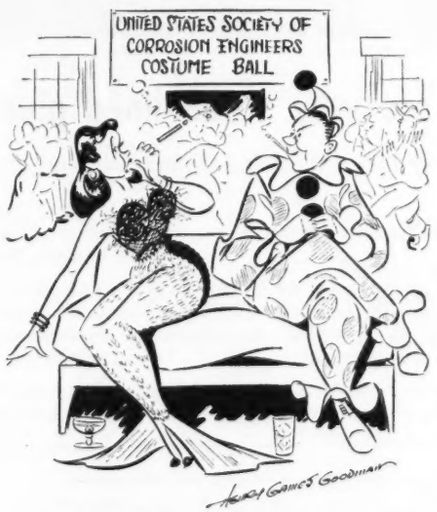
trim furnished in any alloy, hard rubber, plastic, or Teflon

Uses: For use in acid and chemical lines where resistance to corrosion is required.

Features: Rubber-lined valve is available in the smaller sizes of 1 to 1½". It is unusual for a rubber-lined valve to be available that small.

Description: Horizontal swing check valve has body of rubber-lined cast iron or fabricated steel. Trim can be manufactured of any alloy, hard rubber, plastic, or Teflon. In addition to the small sizes, the valve is available in sizes up to 14". Flow reduction or loss of head is negligible.

(Rubber-lined check valve is product of La Favorite Rubber Mfg. Co., Dept. CP, Wagaraw Rd., Hawthorne, N.J. . . . or for more information check 3989 on form opposite last page.)



"A corrosion engineer is an expert in ——DID YOU SAY 'SCALE REMOVAL'?!!!! Don't you dare come any closer, Mr. Penworth!"

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KEL-F, CALIFILM
Tape • Sheet • Rod • Tubing •
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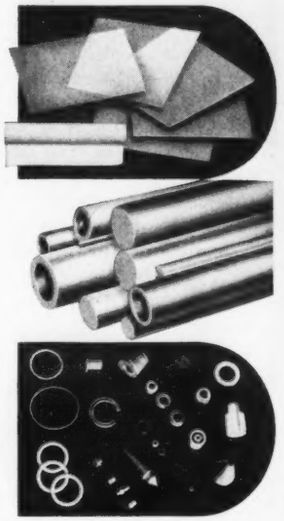

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Back-up Rings...O-rings...Piston rings...Scraper rings...Valve packings...Vee-seals...Tape...Spaghetti...Insulators...Film...Grommets...Glass fabrics...Fiber felt...Extruded shapes...Uncured tape...Filled Teflon...Bondable film...Cementable sheet and tape.

Throughout industry, SHAMBAN's remarkable Qualities are pointing ways to *improve* existing products—providing opportunities to create *new* products and applications! Write, wire or phone for complete data on how SHAMBAN can help you.

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Use the BEST *in Fluorocarbon Products, Specify* SHAMBAN!

KELON

W. S. SHAMBAN & CO.
11617 W. Jefferson Blvd., Culver City, California
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When inquiring check 3990 opposite last page

Announcing **The most complete line, from a single competitive source, of INDUSTRIAL**

PRESERVATIVES

To stabilize and protect solutions of —

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16 high-purity CHEMOCIDES® include:

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- **PARACHLOR-METACRESOL**
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Manufacturers and Processors of:

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should request our new technical data sheet showing antimicrobial activities, solubilities and suggested use levels.

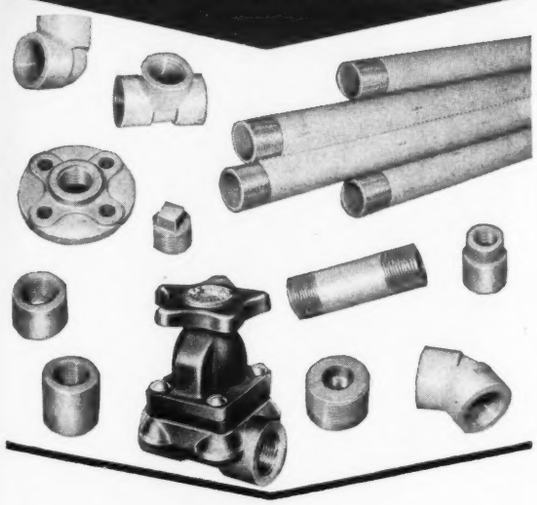
CHEMO PURO **MANUFACTURING CORPORATION**
150 Doremus Avenue, Newark 5, N. J.

When inquiring check 3991 opposite last page

STOP Corrosion with...

Van-Cor

PLASTIC PIPE, FITTINGS AND FABRICATIONS



★ *Both Chemical Resistant, Normal Impact, and Chemical Resistant, High Impact*

★ *Half the Weight of Aluminum, with High Tensile Strength*

★ *Readily Formed, Machined, Drawn, Molded or Welded*

AVAILABLE FORMS

PIPE—¼″ thru 12″ diameter (10 or 20 ft. lengths) ... FITTINGS—¼″ thru 12″... VALVES—½″ thru 2″... SHEETS—1/32″ thru 2″... ROUND BARS—¼″ thru 2″ diameter (10 ft. lengths) ... WELDING ROD—⅛″ and 5/32″ diameter.

TYPICAL APPLICATIONS

A rigid unplasticized polyvinyl chloride, Van-Cor is fabricated into such products as: Ducts, Hoods, Chemical Tanks, Tank Liners, Plating Racks, Fume Stacks and Piping.

WRITE FOR ILLUSTRATED BULLETIN, SPECIFICATIONS, AND NAME OF NEAREST DISTRIBUTOR

INDUSTRIAL DIVISION OF
COLONIAL PLASTICS MFG. CO.

SUBSIDIARY OF THE VAN DORN IRON WORKS CO.
2685 EAST 79th STREET • CLEVELAND 4, OHIO

When inquiring check 3992 opposite last page

Corrosion-proof linings for field application to tanks

Uses: For use in place of PVC plastisols where dip coating or spraying is not feasible.

Features: Flexible, chemically resistant sheets are readily installed in the field.

Description: Sheets are made of plasticized polyvinyl chloride. They can be easily cut to size, then firmly bonded to structure by cement. Joints and corners are finished by heat-fusing flat straps or corner-fillet straps in place with a special hot-air gun.

(Quel-Flex PVC lining material is product of Quelcor, Inc., Dept. CP, Front & Broomall St., Chester, Pa. . . . or for more information check 3993 opposite last page.)

Cement-mortar coating discussed in bulletin

Concrete coating, which can be applied by spraygun and pressure pot to any desired thickness, is cited in four-page bulletin. Application of product is illustrated and described, and advantages are pointed out.

"Rust-Prevention News" (Feb. 1957) is issued by Chemical Fire and Rust Proofing Corp., Dept. CP, 50 Cutter Mill Rd., Great Neck, N.Y. Specify 3994 opposite last page.

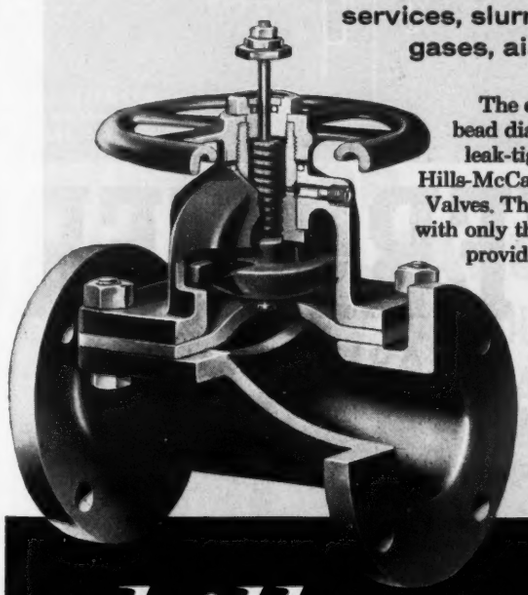
Discusses rust protection of fuel oil additive

Bulletin of four pages discusses low viscosity fuel oil additive designed to overcome burner operational difficulties due to screen and filter clogging. Rust protection properties are pointed out with aid of table.

Tech Bul 0-87 is issued by Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, PO Box 478, St. Louis 1, Mo. Specify 3995 opposite last page.

DIAPHRAGM VALVES

Positive control for all corrosive services, slurries, liquids, gases, air and water



The exclusive sealing bead diaphragm assures leak-tight closure in all Hills-McCanna Diaphragm Valves. This packless valve with only three components provides simple in-line maintenance.

Send for the informative Hills- McCanna booklet #100.

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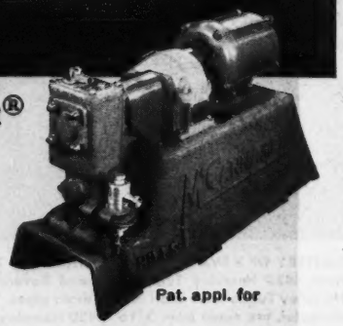
THE PEOPLE WHO KNOW AND CONTROL FLOW

HILLS-McCANNAMETER®
the meter that pumps

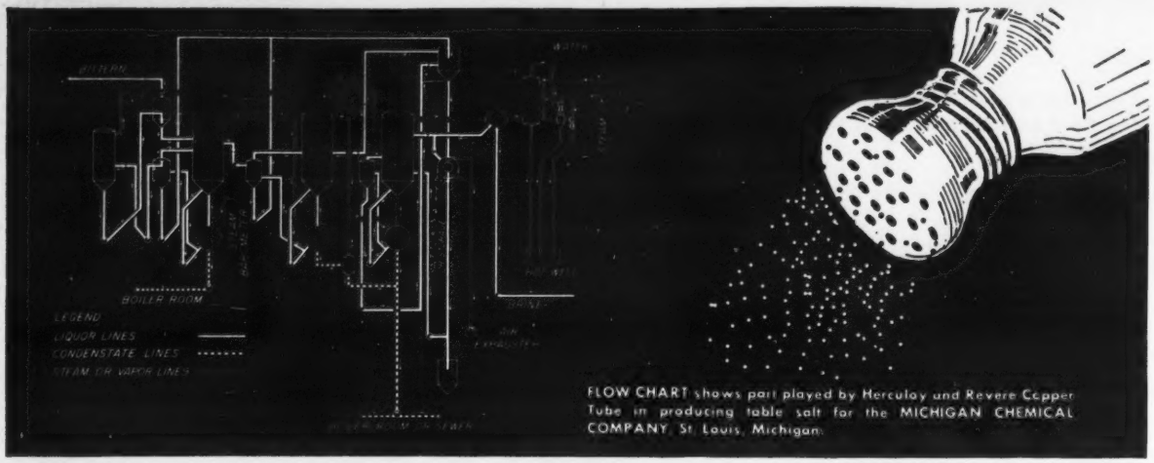
... a new, packless, positive displacement pump for precise production, or laboratory metering and proportioning of low viscosity fluids over extended periods of time. Write for the booklet "The Meter That Pumps."



Pat. appl. for

Hills-McCanna Company, 2370 W. Nelson Ave., Chicago 18, Illinois

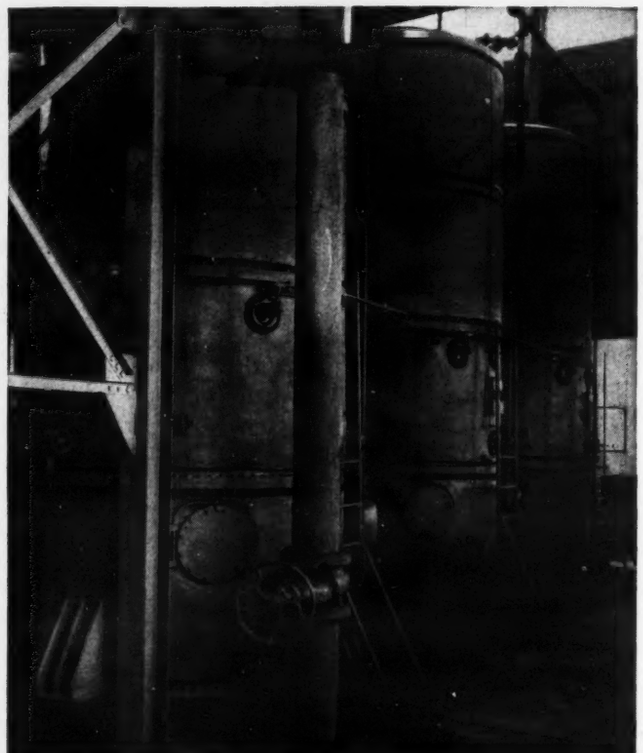
When inquiring check 3996 opposite last page



FLOW CHART shows part played by Herculoy and Revere Copper Tube in producing table salt for the MICHIGAN CHEMICAL COMPANY, St. Louis, Michigan.

REVERE-HERCULOY

(NEARLY 90,000 LBS. OF IT)



BATTERY OF 3 EVAPORATORS fabricated by ZAREMBA COMPANY, Buffalo, N. Y., from #420 Herculoy Tube Plates and Revere Copper Tube. 4" OD and #14 Ga. Herculoy Tubes were used for the drain pipes. Vapor pipes which are 24" and 28" diameter, are made from 3/16" #420 Herculoy sheet.

THE LIQUOR FLASH TANK, 72" diameter x 17' 6" long, was fabricated of ¼" #420 Herculoy while the salt separators were also Herculoy #420 either in sheet or plate form depending on size used.

ADDS SALT
to its long list of
"well done" performances

The very salt that makes our food taste so good can be death to the metals used in the equipment to refine it. That's why corrosion-resistant Revere Herculoy and Revere Copper Tube were picked for the evaporators made for the Michigan Chemical Company, St. Louis, Michigan, by Zaremba Company, Buffalo, N. Y.

After 6 years of this highly corrosive service, Zaremba says, "The Herculoy in these evaporators has stood up exceptionally well in this kind of rugged service. In fact, some cast, rustable-metal parts have already been replaced by Herculoy with more to be replaced in the near future."

Herculoy is Revere's famous silicon bronze alloy with the corrosion resistance of copper and the tensile strength of mild steel. It is non-magnetic, hot-works readily, has excellent fatigue strength and can be successfully welded by any of the standard commercial gas or electric methods. Its physical properties can be varied by treatment during production to fit specific use requirements. Herculoy is but one of the many alloys made by Revere for use in evaporators, heat exchangers, condensers and similar equipment . . . each alloy being tailored to the job to insure maximum service under the most adverse operating conditions. Why not have Revere and its TA (Technical Advisory) Service "trouble-shoot" your problems?

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N.Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.

COPPER * BRASS * 18 01 * REVERE * ALUMINUM

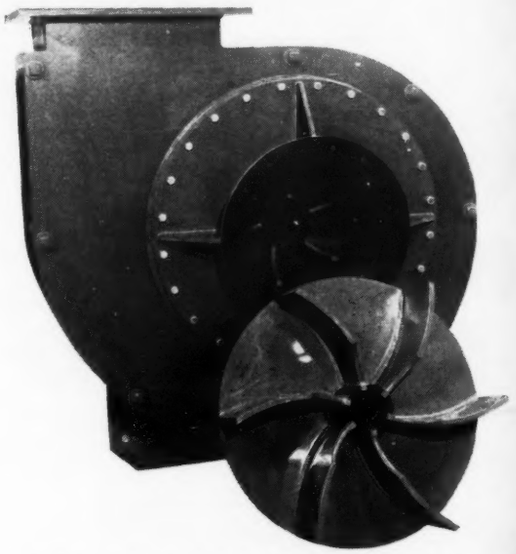
When inquiring check 3997 opposite last page

Corrosive effects of airborne chemicals can be withstood indefinitely by PVC radial-bladed fan . . .

initial cost is less than similar fans made of conventional materials

Uses: Fan is constructed to use in moving chemically-laden air or gases.

Features: All parts exposed to airstream are made of corrosion-resistant, unplasticized polyvinyl chloride. Fan is reported able to withstand



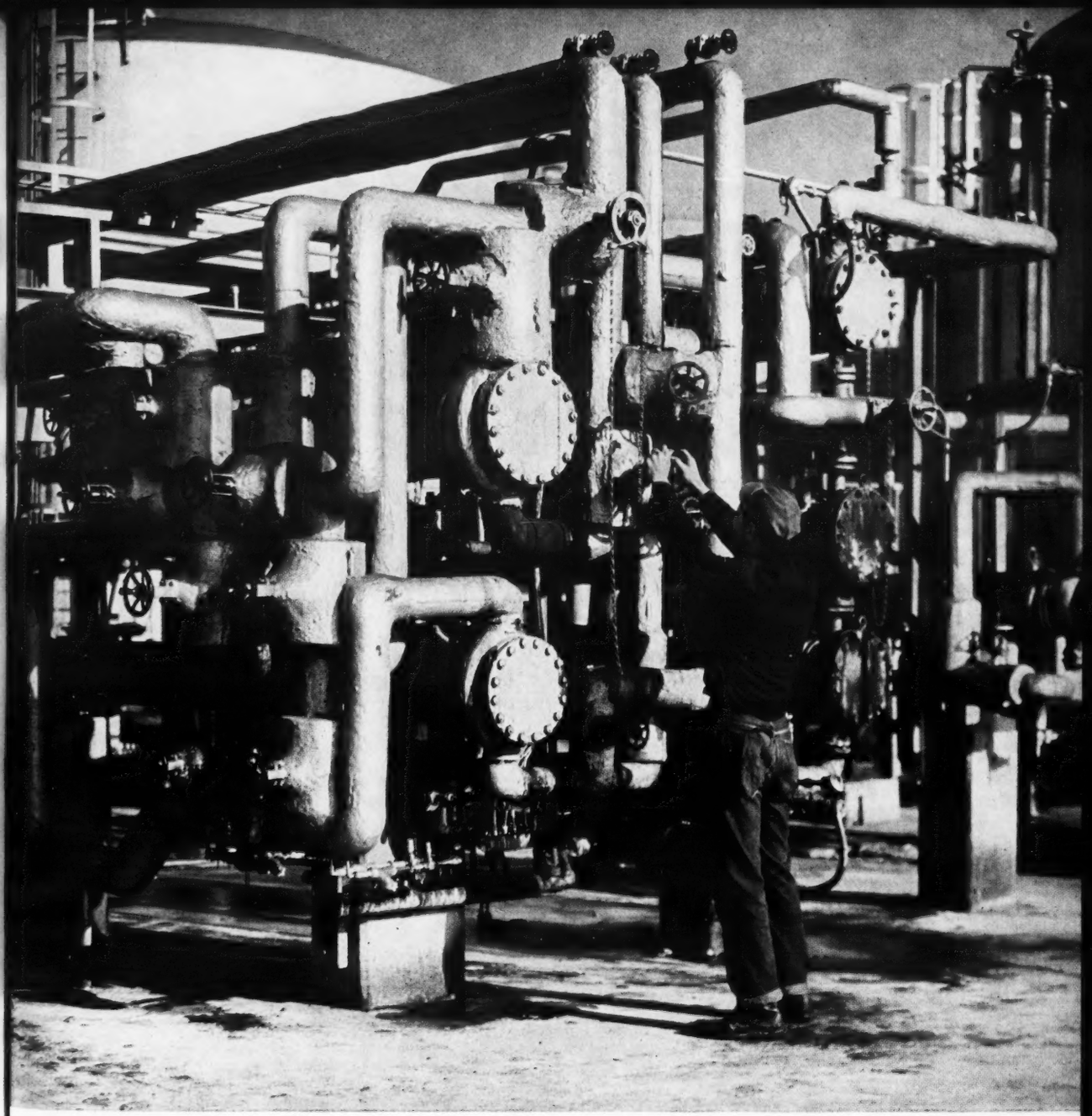
All exposed parts, including blades, scroll, wheel hub, and wheel back-plate are made of corrosion-resistant unplasticized polyvinyl chloride

corrosive effects of airborne chemicals indefinitely, yet it costs less than similar fans of conventional material.

Description: Designed for floor, platform, or roof mounting, PVC fan is available in belt-driven sizes from 12 to 40" in diameter. Performance ranges from 200 to 10,000 cfm at pressures to 6" SP, and from ¼ to 10 hp at temperatures to 150°F, depending on fan diameter. Steel base is protected by a corrosion-resistant coating. Discharge direction of PVC housing can be adjusted in field to fit job requirements.

(PVC radial-bladed fan is product of Chicago Blower Corp., Dept. CP, 9863 Pacific Ave., Franklin Park, Ill. . . . or for more information check 3998 on convenient Reader Service slip which is located opposite last page.)

For more information on product advertised at right, specify 3999 . . . see information request blank opposite last page.



Easy way to keep tall oil moving: Aloyco jacketed valves

You're looking at a portion of the recently completed tall oil fractionation plant Foster Wheeler built for Union Bag-Camp Paper Corporation near Savannah, Ga.

The jacketed Aloyco stainless steel valves (with red hand wheels) get quite a workout in the two stage fractional distillation process here. Rosin and an intermediate fatty acid are produced in the first stage. Then the fatty acid is rerun through the main fractionating tower to produce a refined product for the manufacture of high grade alkyd resins, processing oils, soaps and chemical intermediaries.

Completely jacketed Aloyco valves are designed to ease handling of tars, tar oils, rosins and other materials difficult to move at room temperature.

Aloyco's integrally cast, completely jacketed valves insure long life and low maintenance in high temperature corrosive service. For more information, write Alloy Steel Products Co., 1301 West Elizabeth Ave., Linden, N. J. 7-1

Longer Lasting
ALOYCO
VALVES
1ST IN CORROSIVE SERVICE

ALLOY STEEL PRODUCTS CO., LINDEN, NEW JERSEY

for Chemical Processing Advertisers*

The emblem at right is that of NBP—National Business Publications. You've probably seen it before on our contents page . . . rate card . . . or heading the CHEMICAL PROCESSING listing in Standard Rate & Data. Because we're proud of it.

It signifies that CHEMICAL PROCESSING has qualified for membership in the largest association of technical, scientific and professional journals in the United States. (We're proud, too, that our C. P. executive staff includes a past president of NBP and a member of its Board of Directors.)

But belonging to NBP is more than a feather in our publishing cap. It's an important *plus* for every advertiser in CHEMICAL PROCESSING. Here are the membership requirements. Judge for yourself:

- **Unbiased editorial content**
- **Periodic reader interest evaluation**
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NBP

Chemical Processing

For men who manage the Chemical Processing Industries

Published by Putman Publishing Company

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EPA NBP

PUTMAN PP PUBLISHING

★ Courtesy of the publication MEDICAL ECONOMICS, creator of this copy, here adapted to CHEMICAL PROCESSING

Epoxy Coating System

Starts on page 106

Stopple station diverted water to double bypass line (right) so that main line (left) could be cleaned and coated without interrupting flow of water

Sharp turns, mitred at 45° angles, added another difficulty.

Field crew prepared line for coating in five steps:

1) About two miles of pipeline would be bypassed, leaving this section open for cleaning and coating.

2) A flexible ripper with spring-tooth scrapers loosened scale and corrosion products.

3) Wads of steel cuttings scraped pits and removed tightly adhering scale.

4) Wads of cotton waste wiped the line.

5) A series of washes with methyl ethyl ketone finished the cleanup, and pipe was dried with air. Compressed air propelled all cleaning tools and materials.

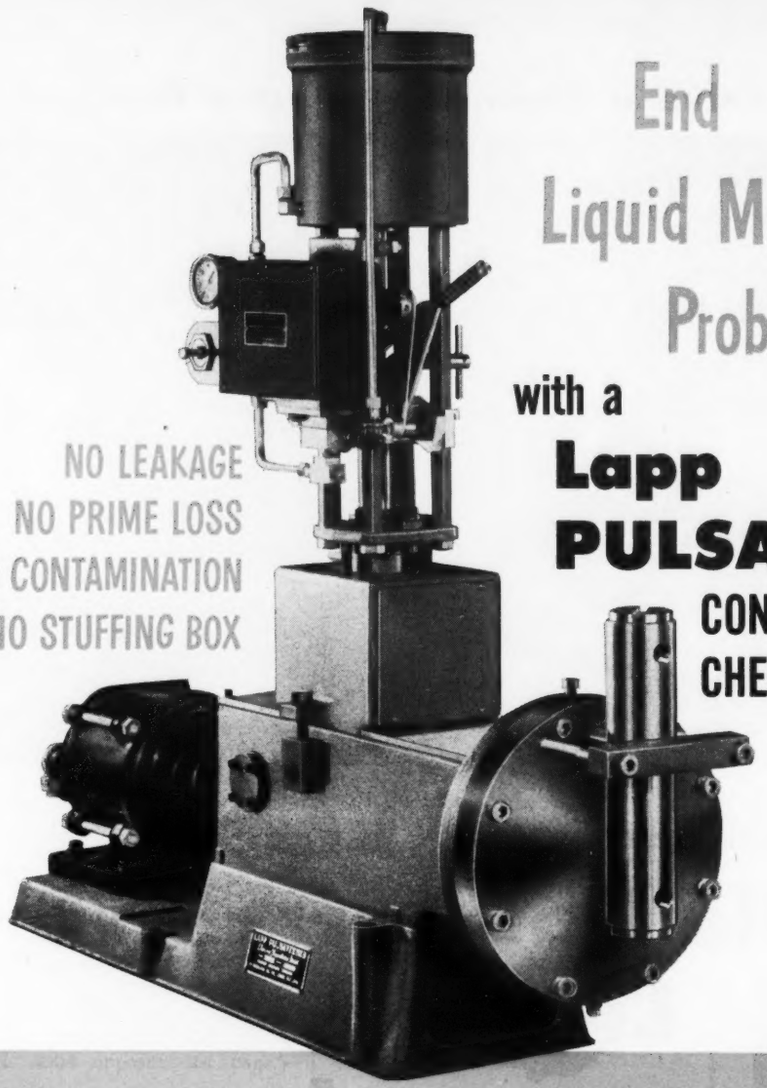
Immediately after cleaning, crew coated bypassed line with 920-R-128 epoxy coating. This was done by pressurizing coating on interior of line between a pair of plugs, each plug consisting of two double-opposed rubber cylinders on a flexible joint. For a typical 10,500' length of line, 340 gallons of coating was used. This was well over theoretical requirements. Bad pits and crevices in bell-and-spigot joints called for the extra coating as "insurance."

Film thickness was controlled by size of orifices in the plugs and by air pressure against both ends of plugs. Higher air pressure against back plugs pushed the "train" of plugs and coating down the line. After application, coating was dried for four hours by continuous air passage at 40 psi pressure. Air drying without pressure continued overnight. Dry film thickness averaged eight mils from the single application. After finishing a length of line, crew would move the bypass and repeat the process on

Turn to next page

End
Liquid Metering
Problems
with a
Lapp
PULSAFEEDER
CONTROLLED-VOLUME
CHEMICAL PUMP

NO LEAKAGE
NO PRIME LOSS
NO CONTAMINATION
NO STUFFING BOX



WRITE FOR BULLETIN 440
with typical applications, flow charts, description and specification of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Division, 554 Poplar Street, Le Roy, N. Y.

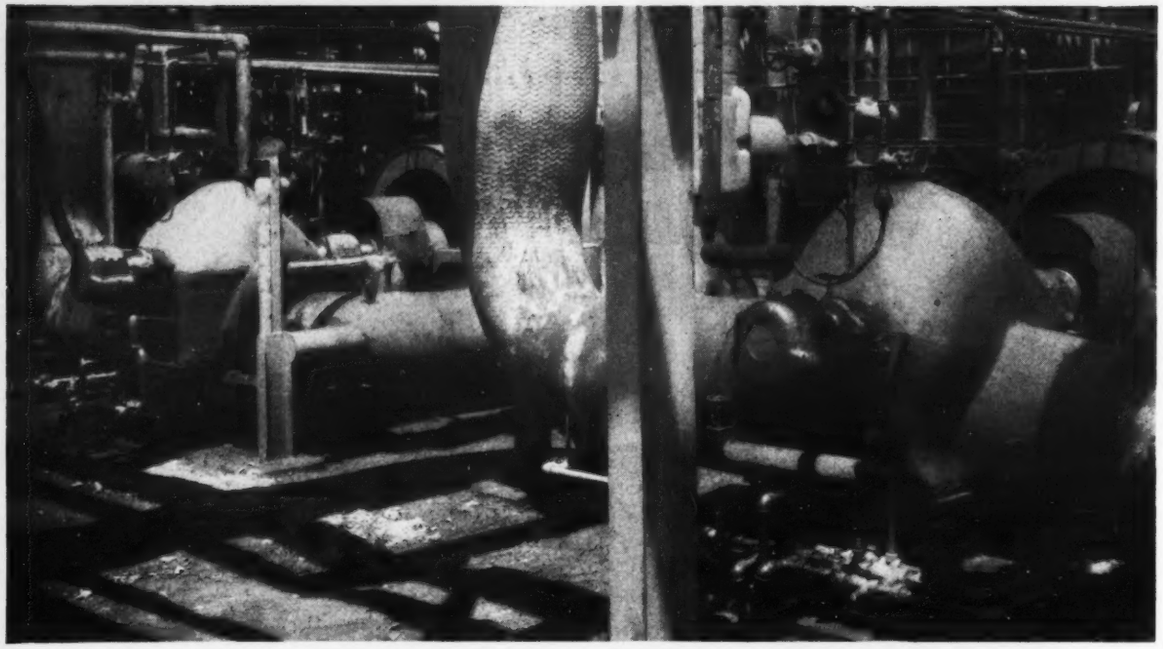
● Precise metering, pumping, proportioning and feeding of hard-to-handle chemicals is the specialty of the Lapp PULSAFEEDER. Designed for accurate handling of corrosive and non-corrosive liquids, it is a combination piston-diaphragm pump . . . providing positive displacement with *no stuffing box*. Leakage or contamination of the liquid being pumped is prevented by a hydraulically balanced diaphragm isolating the liquid from the pump's drive mechanism. All pump parts contacting liquid are of special corrosion-resistant materials. Pumping speed is constant; variable flow results from variation in piston-stroke length, controlled manually by hand-wheel, or, in auto-pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable.

Lapp

When inquiring check 4000 opposite last page

Allis-Chalmers

PUMPS Solve a Chemical Industry Problem



All-Stainless-Steel Pumps Handle Hot Corrosive Liquids

Manufactured on duty-specifications from the customer, these Allis-Chalmers Type SG stainless steel pumps are successfully handling a highly corrosive mixture of carbonate, urea, oil, and water at 260 F.

This is another example of the way Allis-Chalmers serves the chemical industry with a wide range of types of pumps in all sizes. These versatile, high efficiency Allis-Chalmers pumps are available in many special materials to meet specific application requirements.

For full information on how Allis-Chalmers can help you reduce costs, contact your local Allis-Chalmers district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

You Get MORE when you Get ALLIS-CHALMERS

You can benefit from Allis-Chalmers years of experience in pump manufacturing for all industries. The design and engineering skill resulting from this experience is at your service — you get special construction pumps that give top performance and low operating costs.

Allis-Chalmers industry-experienced engineers will help you select exactly the Allis-Chalmers pump to meet your needs, and Allis-Chalmers can furnish a complete pump unit—pump, motor, and control.

A-C ALLIS-CHALMERS

A-4983

ALLIS-CHALMERS

When inquiring check 4001 opposite last page

Epoxy Coating System

Starts on page 106

Scraper, pushed by compressed air, removes scale from interior of pipe. Upper line is one section of bypass

another two-mile section of line.

Outside of line was cathodically protected and coal-tar wrapped by standard procedure. As a field test, same epoxy coating used on inside was used for coating outside of line where Stoppel was placed at two-mile intervals.

Results: Cleaning and coating procedure has restored the line to excellent condition. Examination showed the finish well cured and hard, with no evidence of runs, sags, or solvent wash. Surface is smooth and glossy, with a firm bond to pipe walls. Repairs were required on only about 5% of the line, cleaning and coating being adequate for restoration of the other 95%. Total cost of this was less than one-third the expense of a new pipe line. Most of the cost was for the bypass. Cleaning and coating by itself was about $110,000.

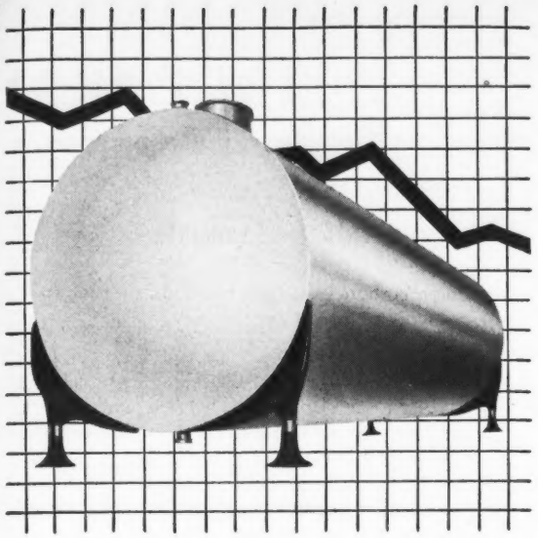
Before coating, the line delivered 1750 gpm of water with 300 psi pressure. After coating, line delivered 2170 gpm of water, with the line pressure reduced to 165 psi. Hence, flow has been increased by one-fourth, with a reduction in hp required for pumping.

Operating costs have dropped at the plant because time is no longer lost due to an inadequate supply of water. Coating is expected to prevent corrosion and formation of scale inside pipe for a long time.

One big advantage found for the coating was that it was possible to obtain 8 mils thickness in one coat, with no primer or intermediate coats needed. Also, the fact that each section could be returned to service a few hours after coating was an advantage. Coating continues to harden for about a week.

(Pipeline cleaning and coating project, including bypass, was planned and engineered by Pipecote Service Corp., 3920 S. Peoria St., Tulsa, Okla.)

(Epoxy coating 920-R-128 is product of Cook Paint & Varnish Co., Dept. CP, PO Box 389, Kansas City 41, Mo. Check 4002 opposite last page.)



Here's a low-cost way

to stop corrosion of storage vessels

Storing corrosive acids (or protecting sensitive and/or expensive solvents against metallic contamination) need not cost you a fortune for dependable storage vessels.

Sure, there is a wide choice of materials from which you can build storage vessels. But on a cost-service basis you just can't beat Pfaudler Glassed Steel Chemstor® Vessels.

Now let's examine that. First, both glass and steel are low-cost materials. Second, fusing the glass to steel storage vessels is not expensive. Result, a durable glassed steel vessel—at very reasonable cost.

Add corrosion resistance and you've got something. Two types of glass are applied, Pfaudler 28T, good for corrosives in tanks up to 15,000 gallons; the other, Pfaudler 28, for mild service—such as phenol, alcohol, formaldehyde, etc., for tanks up to 35,000 gallons.

What about cost? You can buy Chemstor vessels from 25c to $1.00 per gallon, depending on size. This *does* give you a way to stop corrosion of storage at low cost. For complete specifications, send for Bulletin 918.

Pfaudler

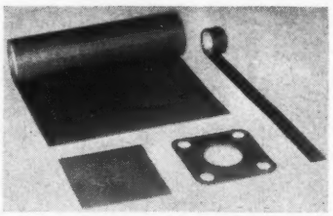
THE PFAUDLER CO., Dept. CP-6, Rochester 3, N. Y.

When inquiring check 4003 opposite last page

Combines best elements of glass fiber and Teflon . . .

product available in sheet, tapes, and rolls

Recently-developed material combines the advantageous properties of glass fiber and Teflon. Product is highly resistant to chemicals and solvents, temperature extremes, and has exceptionally good insulation characteristics. It also has a high degree of dimensional stability and mechanical strength.



Teflon product can be fabricated in a variety of shapes

Product is available in tapes, sheets, and rolls. It is also offered in fabricated form, in belts, pads, or other shapes. It can be stitched with a recently developed type of Teflon thread.

(Teflon product is available from Chicago Gasket Co., Dept. CP, 1271 W. North Ave., Chicago 22, Ill. . . . or for more information check 4004 opposite last page.)

Gives surface properties of stainless steel

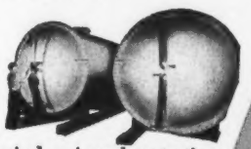
Metal diffusion process that produces stainless alloy surface equivalent to 430 stainless steel in corrosion protection and heat resistance properties is described in eight-page bulletin. Bulletin tells how process works, and what it does, as well as listing typical applications. Specifications and test data are provided. Table shows corrosion resistance of chromium-diffused materials in various media.

Bul 102 is issued by Alloy Surfaces Co., Dept. CP, Wilmington 1, Del. When inquiring specify 4005 opp. last page.

STAYS TOUGH AT SUB-ZERO TEMPERATURES

Ace Parian . . . odorless, tasteless, rigid polyethylene. Best chemical resistance of any plastic at room temp. except to acetic acid. Excellent impact strength at sub-zero temp. Rigid pipe ½" to 2". *Bul. 351.*

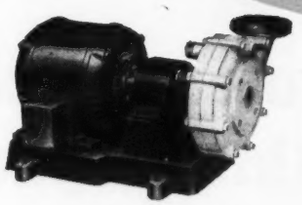
LIFE-TIME ACID STORAGE TANKS
Rubber-lined by ACE 2-layer system



Economical, universal protection against all alkalis, metallic salts, practically all inorganic acids, hydrochloric acid any strength, sulphuric to 50%, nitric to 20%, phosphoric to 75%. Good to 160 deg. F. . . . sometimes higher. Soft rubber interlayer aids shock resistance.

Now eleven ACE Materials to STOP CORROSION

Eleven job-proved rubber and plastic materials now available in ACE piping, valves, pumps and tanks. Tough Ace-lite rubber-plastic blend . . . Saran . . . heat-resistant Tempron . . . Riviclor PVC . . . many others. Write for comparative properties Bulletin CE-50 . . . or call your American Hard Rubber Company distributor.



ACE "WAM" . . . THE FINEST *Non-metallic Acid Pump*

On job after job, this 80-gpm. centrifugal pump has earned highest praise. Hard rubber casing and impeller, Hastelloy C shaft. Handles nearly all corrosives. Mechanically simple, trouble-free. *Bulletin CE-55.* Larger Ace pumps available.

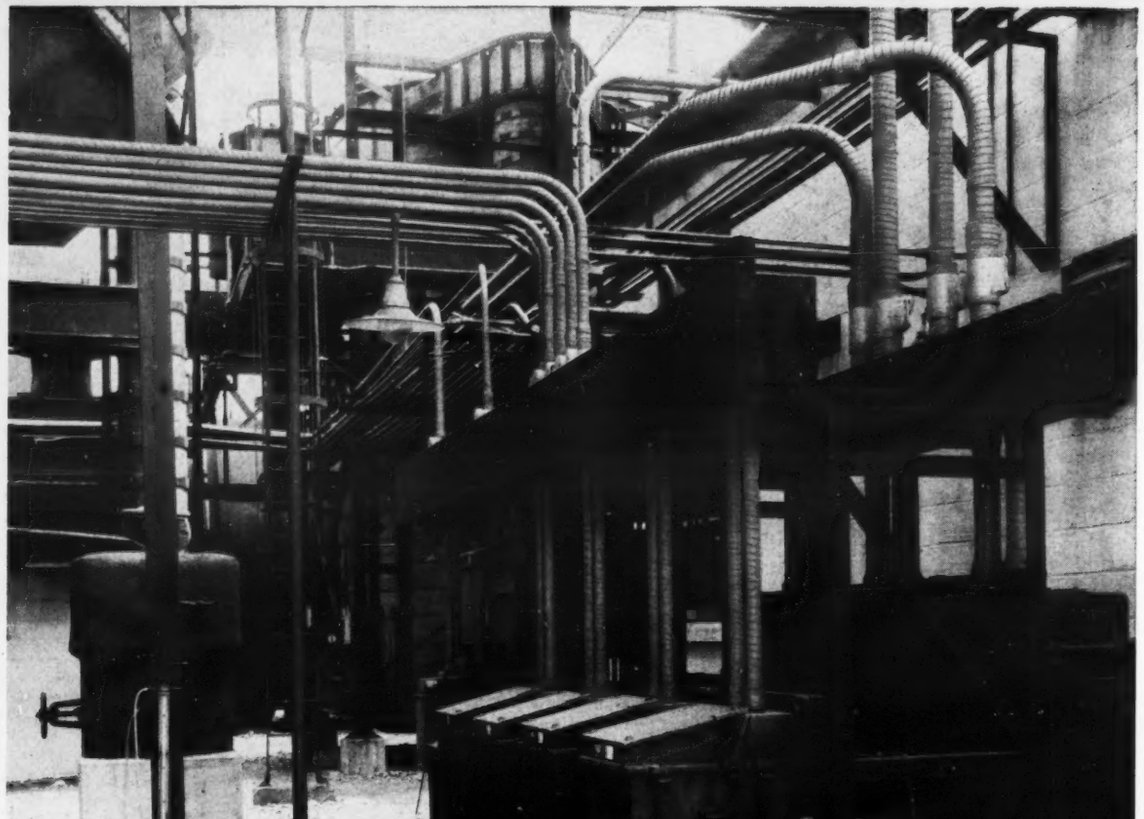
NEED SPECIAL FITTINGS, COVERS, TANKS, PARTS?

If you want life-time corrosion protection for special parts needed in quantity . . . we may save for you by molding them of Ace hard rubber or plastics to your most exacting requirements. Our facilities among world's largest. Ask for recommendations.

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
93 WORTH STREET • NEW YORK 13, N. Y.

When inquiring check 4006 opposite last page



Polyken® protective coating beats corrosion in this sulphuric acid plant

They're using durable Polyken Tape *to protect electrical conduit in and around the cooling tower*

The Switch Box and Controller Station you see here is located at the cooling tower of Gulf Oil's Port Arthur, Texas, sulphuric acid plant. As you know, where there's sulphuric acid, there's a big need for protection against corrosion.

Formerly, they used paint on the electrical conduit. That lasted only three or four months.

But *Polyken* Protective Coating has kept the conduit in excellent condition since 1953. The tape itself is in excellent condition, too.

Polyken Tape gives dependable protection because it's manufactured from controlled raw materials under controlled conditions. Its tough polyethylene backing offers high electrical insulation resistance, high resistance to corrosive action.

Just as important, *Polyken* Protective Tape Coatings go on right from the roll. The thick adhesive mass provides strong adhesion to cylindrical surfaces and a self-seal at the lap. That means faster, more effective, lower-cost application—when it's put on and in the long run.

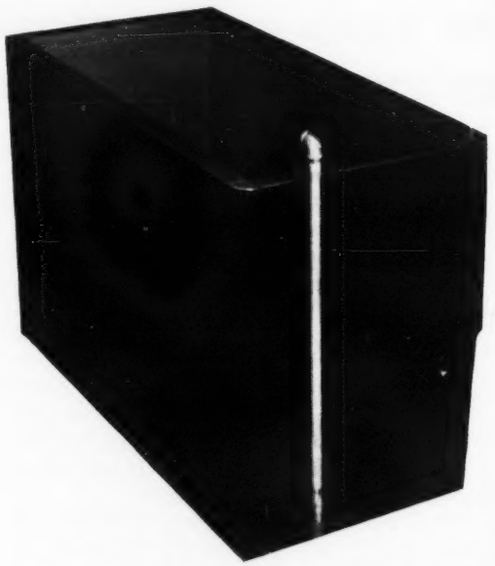
Polyken®
PROTECTIVE COATINGS
THE KENDALL COMPANY
Polyken Sales Division

To talk over your project—write, wire or phone *Polyken Sales Division*, 309 W. Jackson Blvd., Chicago 6, Illinois. Webster 9-7100.
Complete catalog, Sweet's Industrial Construction File, Sec. 3J/Ke

American Chemical Paint Company successfully uses tanks lined with plastic laminate

Fluorocarbon material withstands concentrated mixtures of corrosives

Two fixed tanks lined with fluorocarbon plastic laminate have successfully handled Thermoil Granodine 112 and Granodraw SS (metal protective and paint-bonding chemicals) for more than a year at the American Chemical Paint Company of Ambler, Pa. Corrosion protection has been complete with minimum scaling on the tank sides and no loss of the fluorocarbon plastic bond to substrate or of laminate to tank.



One of fluorocarbon plastic laminate-lined tanks in service at American Chemical Paint Company

Tank lining is a tough, cementable laminate of glass cloth coated with Kel-F fluorocarbon plastic. Resistance of the fluorocarbon plastic to chemical action under critical conditions has proved satisfactory. American Chemical Paint is extremely pleased with the tanks and plans to use more of this type of lining as the opportunity presents itself.

One tank is rectangular and has a 15 gallon capacity. The second, built on the basis of satisfactory performance of the first, is similarly shaped and holds about 200 gallons. Both tanks have been in constant use since November 1955 and are still in good condition.

Service has been equally good in handling Thermoil Granodine 112 (a concentrated mixture of nitric

When inquiring check 4007 opposite last page

ELIMINATE CORROSION!

By a POLYFLUORON* Dispersion Coating System

Now available in Aerosol Dispenser

- **For corrosion resistance coatings.**
- **For coating laboratory ware for corrosion resistance and anti-tack applications.**
- **For coating production items where spray equipment is unavailable.**

POLYFLUORON* coating systems may be applied over any material that will withstand the fusion temperature of the resin 475° F. **POLYFLUORON*** aerosol dispenser and Primer 150 now available for $4.00. Trial Order (enough for adequate, convincing test), complete instructions and information included. Available in quantity for use with standard paint spraying equipment. **POLYFLUORON*** is also available in pellets for molding and extrusion applications.

*Registered trademark for Acme Resin Corporation trifluorochloroethylene resins.

ACME
RESIN CORPORATION
Manufacturers of
Diallyl Phthalate and Shell Molding Resins

ACME RESIN CORPORATION
1401 CIRCLE AVENUE • FOREST PARK, ILL.
(A Suburb of Chicago)
Four dollars ($4.00) is enclosed for a Trial Dispenser of **POLYFLUORON*** and the necessary Primer.
NAME_____
FIRM_____
ADDRESS_____

When inquiring check 4008 opposite last page

acid, phosphoric acid, plus nickel in solution) and Granodraw SS (a concentrated mixture of oxalic acid, sulfuric acid, and hydrofluoric acid) in both tanks. Heating is by steam coil handling 125 psi steam at a maximum temperature of 353°F.

(Kel-F fluorocarbon plastic is product of Minnesota Mining & Manufacturing Co., Dept. CP, 900 Fauquier St., St. Paul 6, Minn. . . . or check 4009 on form opposite last page.)

(Fluorocarbon plastic laminate is product of United States Gasket Co., Plastics Div., The Garlock Packing Co., Dept. CP, 600 N. 10th St., Camden, N.J. . . . or check 4009A opposite last page.)

West Virginia Pulp and Paper handles low-pH solutions with rubber-lined pipe . . .

header for furnish has lasted more than two years in corrosive service

Problem: Cast steel pipe lasted only one month and stainless steel pipe only two or three months handling low-pH solution at the Luke, Md., plant of West Virginia Pulp and Paper Company. Piping was being used for transporting furnish to the headbox of a Dirtec unit, which functions like a cyclone separator. The pH of the solution is about 4.8 to 5.2.

Solution: In Nov. 1954 rubber-lined piping was installed for the operation. Installation consisted of a 6" diameter header, with 3" diameter inlets — all lined with rubber. Hills-McCanna rubber-lined diaphragm valves were also installed in the setup.

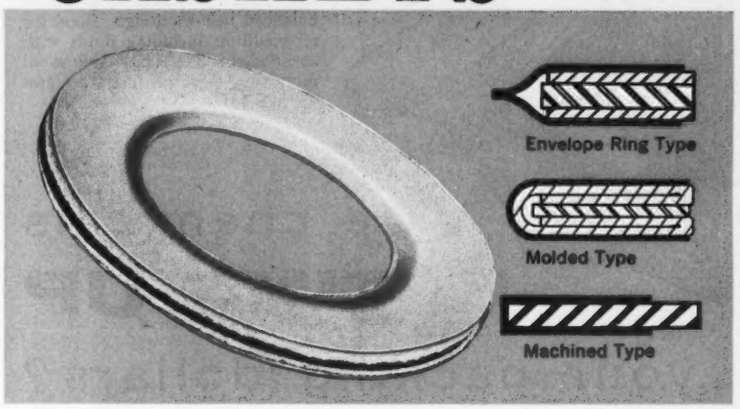
Linings for pipe are made from a thick, calendered sheet of rubber. A special method of securely bonding the rubber to the metal is used so that it is practically impossible to separate the lining from the metal.

Rubber-lined pipe is also used in plant in a number of other places for handling low-pH solutions. In some cases, where piping is complex, the unlined pipe is made up and then sent to factory for lining. In other cases, the rubber-lined pipe is ordered complete as specified.

Results: Rubber-lined pipe has already lasted more than two years in the headbox installation, compared to the one-to-three months service obtained with previous piping. In addition to providing protection against corrosion, elimination of possible contamination is also an advantage achieved with the rubber-lined pipe at the plant.

(For further information on rubber-lined pipe contact Manhattan Rubber Div., Raybestos-Manhattan, Inc., Dept. CP, Passaic, N. J. . . . or check 4010 on the convenient Reader Service slip which is located opposite last page.)

GASKETS for every service

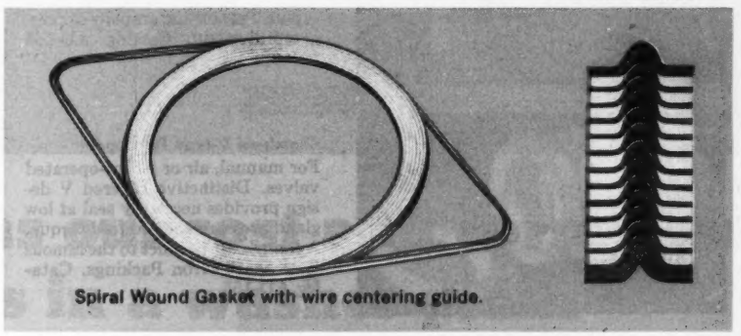


Chemically Impervious TEFLON*

Teflon gaskets in corrosion service provide months of efficient sealing where other materials have failed in hours.

Belmont Teflon Jacketed Gaskets offer special filler materials and inserts which meet specific installation and operating needs with respect to compressibility, resilience and rigidity. Hence, they protect special chemical piping and equipment against excessive bolt loading while insuring perfect seals at each connection—whether between metal, glass, glass-lined, Karbate, Haveg, porcelain, etc.

*du Pont trademark


Spiral Wound Gasket with wire centering guide.

BELMONT Spiral Wound

Belmont Spiral Wound are gaskets with resilience "built in" for positive sealing action under the toughest service conditions.

Depending upon service, metal is either plated low-carbon steel or stainless. Filler materials are white or blue asbestos, or Teflon.

ask your BELMONT Distributor

Such leading Packing Distributors as
Tennessee Mill & Mine Supply Co. in Knoxville and **J. G. Christopher Co. in Jacksonville**
are ready to serve you promptly and helpfully, wherever you are.

The Belmont Packing & Rubber Co. • Butler & Sepviva Sts., Phila. 37, Pa.

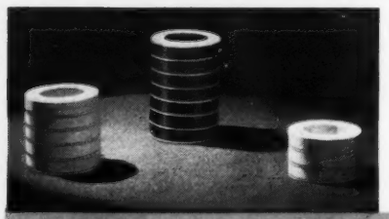
BELMONT

When inquiring check 4011 opposite last page

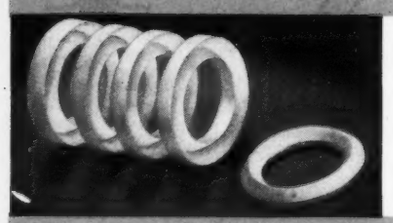
Chemiseal Mechanical Seal—
An ALL-TEFLON Seal of pressure-balanced bellows design. Good for all mediums including fluids with suspended solids. Applicable to all pump or agitator shafts. Catalog MS-1155

are chemicals
EATING UP
your packing dollars?

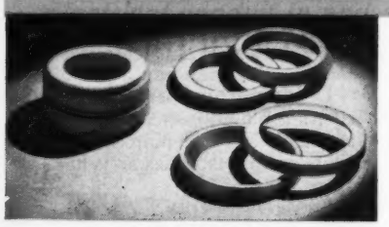
Try Chemiseal Packings and Chemiseal Mechanical Seals that give months of service instead of hours. Made of duPont TEFLON —impervious to practically all chemicals—they won't deteriorate, they won't contaminate, they won't "freeze" shaft action. Write for literature.



Chemiseal Pump Packings—
For general purpose or non-contaminating pump service throughout the processing industries. Two types —pure TEFLON and graphite impregnated TEFLON. Catalog AD-155



Chemiseal V-type Packings—
For manual, air or motor-operated valves. Distinctive tapered V design provides necessary seal at low gland pressure and reduced torque. A companion product to the famous Garlock Chevron Packings. Catalog AD-155



Chemiseal Wedge-type Packings—
For valves made of Haveg, Karbate, ceramics, etc. Offers unusually low gland pressure. Rings provide cushion against thermal expansion. Adaptable for spring loading where exceptionally low friction load is required. Catalog AD-155

United States Gasket Company
Camden 1, New Jersey

United States Gasket *Plastics Division*
OF THE GARLOCK PACKING COMPANY

When inquiring check 4012 opposite last page

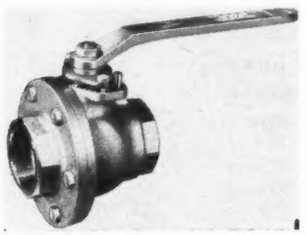
CORROSION

Stainless steel ball valve equipped with Teflon seals and trim . . .

¼ turn opens and closes full round flow unit

Uses: For controlling flow of corrosive liquids in chemical and other processing plants.

Features: Unit is equipped with Teflon seals and trim. Full round flow valve opens and closes with only ¼ turn.



Offset handle of corrosion-resistant stainless ball valve can be put on in eight different positions

Description: Stainless steel ball valve has low pressure sealing, and is easy to operate. Stem repacking can be done without removing valve from line. Handle of valve can be put on in eight different positions. Valve is available in ⅜ to 2" sizes.

(Type 316 stainless steel ball valve is product of Rockwood Sprinkler Co., Dept. CP, 38 Harlow St., Worcester 5, Mass. . . . or for more information check 4013 opposite last page.)

Guards against corrosion at high temperatures

Bulletin of four pages describes four types of coatings to protect against scaling and corrosion at temperatures up to 2100°F. Information on where to use, how to apply, temperature range and colors, drying time, and amount of coverage is included.

Form MPC 25-956 is issued by Markal Co., Dept. CP, 3052 W. Carroll Ave., Chicago 12, Ill. Specify 4014 opp. last page.

EVACUATING AIR or CORROSIVE GAS?

You can do it with a low-cost I-R EJECTOR

In serving the vacuum producing needs of industry for the past 30 years, Ingersoll-Rand has produced steam-jet ejectors to meet virtually every conceivable requirement.

Available in standard or corrosion-resistant construction, with 1" to 66" suction, these simple, rugged units have no moving parts — require only a supply of steam for efficient, dependable operation.

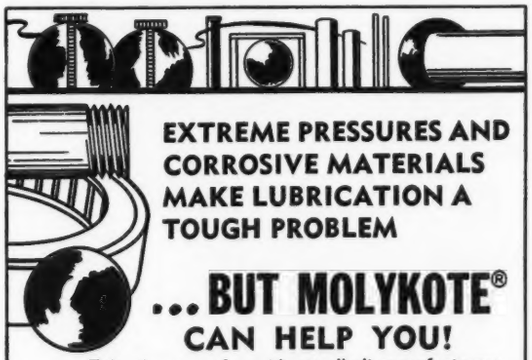
Contact your nearest branch office for full details, or write for Bulletin 9013-A.

4-134

Ingersoll-Rand
11 Broadway, New York 4, N. Y.

PUMPS • COMPRESSORS • TURBO-BLOWERS • VACUUM EQUIPMENT
AIR & ELECTRIC TOOLS • GAS & DIESEL ENGINES

When inquiring check 4015 opposite last page



EXTREME PRESSURES AND CORROSIVE MATERIALS MAKE LUBRICATION A TOUGH PROBLEM

...BUT MOLYKOTE® CAN HELP YOU!

Take the case of a midwest alkali manufacturer: In drying bicarbonate of soda, several kilns were used in which 24" diameter chilled cast iron bearings supported a 24" steel shaft. These bearings rotate slowly carrying a weight of 40,000 pounds. The bearings wore rapidly. The temperature varied from 400° to 500°F and this caused the lubricating grease to melt resulting in product spoilage. A problem? It certainly was! Now . . . the bearings are given 4 coats of MOLYKOTE M-88, dry film lubricant, and this is the only lubricant applied. Inspection at 4-month intervals shows negligible wear. Product spoilage is eliminated.

This is only one of many interesting case histories in our Field Report File. If you have a lubrication problem, send right away for Field Report 2, covering the CHEMICAL industry.

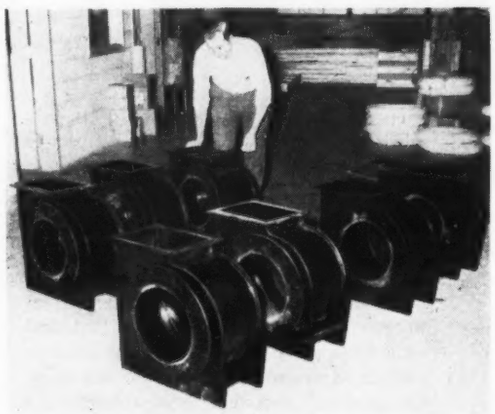
THE ALPHA MOLYKOTE CORP.
Main Factories: 65 Harvard Avenue, Stamford, Conn.
71 Arnulfstrasse, Munich 19, Germany
750

When inquiring check 4016 opposite last page

Corrosive fumes and vapors foiled by ventilator housings, rotors made of polyethylene

Uses: For removing undesirable fumes and providing fresh air.

Features: Housings and rotors are completely constructed of polyethylene; no metallic parts are exposed to corrosive fumes and vapors that pass through ventilators.



Polyethylene housings and rotors resist corrosive effects of fumes and vapors

Description: Polyethylene ventilators are designed to handle static pressures from ⅛ to 4″ and move from 100 to 3400 cu ft of air per minute, depending on sizes used. Company has 6-, 8-, 10-, and 12″-diameter inlet sizes available.

(Polyethylene ventilators are product of American Agile Corp., Dept. CP, PO Box 168, Bedford, Ohio. Check 4017 opposite last page.)

Plastic withstands hydrofluoric at temperatures up to 240°F in continuous operation

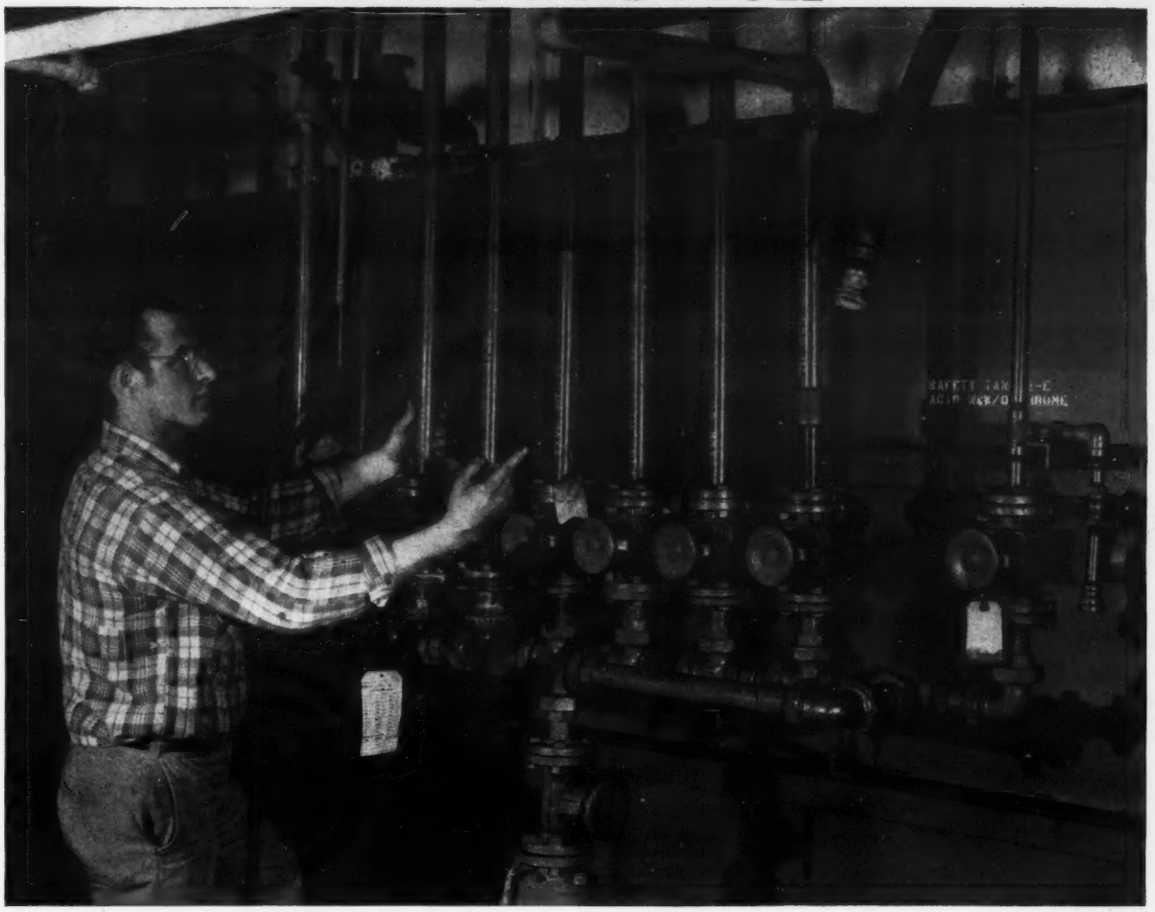
Uses: Material is designed to combat corrosive effects of hydrofluoric acid and other fluorides.

Features: All concentrations of HF up to temperatures of 240°F in continuous operation can be withstood.

Description: Graphite-filled epoxy resin will also handle fluorine salts and chemical reactions of HF with organics or inorganics. For short-time overloads, plastic can be subjected to even higher temperatures than 240°F. Pipe, pump parts, valves, towers, and tanks up to 10′ in diameter have been fabricated with this material.

(Haveg 093 is product of Haveg Industries, Inc., Dept. CP, 900 Greenbank Rd., Wilmington 8, Del. Check 4018 opposite last page.)

B.F.Goodrich



Koroseal irons out cost and corrosion wrinkles in a washer plant

CARRYING various kinds of strong acids used in electroplating processes is the job of these rigid polyvinyl chloride pipes at the Maytag Company, Newton, Iowa. Should these pipes fail, the entire plating operation in this washer and drier plant would stop.

After using other types of pipe for carrying acids, brine mixtures and caustics Maytag decided to try Koroseal. Here's what they found: Less costly to begin with, Koroseal further reduced expense because it was easier to handle and install. Maintenance costs have been cut and the combined features of corrosion resistance coupled with Koroseal's unusually long-wearing characteristics assure them continuous trouble-free operation.

Versatile Koroseal rigid pipe has answered countless problems for many progressive manufacturers. Exceptionally easy to install, it can be threaded, cut, welded or drilled. It has excellent insulation properties, will not support combustion, and never needs painting.

Koroseal PVC is unaffected by most alkalies and acids. It is completely inert in the presence of oil, alcohol, and salt solutions. Unusually strong, it has high impact resistance and is available in tubes, rods, valves and sheets.

For information on how Koroseal can make your operations more efficient, more profitable, fill in and mail the coupon to your right. *B.F.Goodrich Industrial Products Company, Marietta, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS CO.

B.F.Goodrich Industrial Products Co.
Dept. CP-6
Marietta, Ohio

Please send me free booklets on.

☐ Rigid Koroseal Pipe
☐ Rigid Koroseal Sheet

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Company_____

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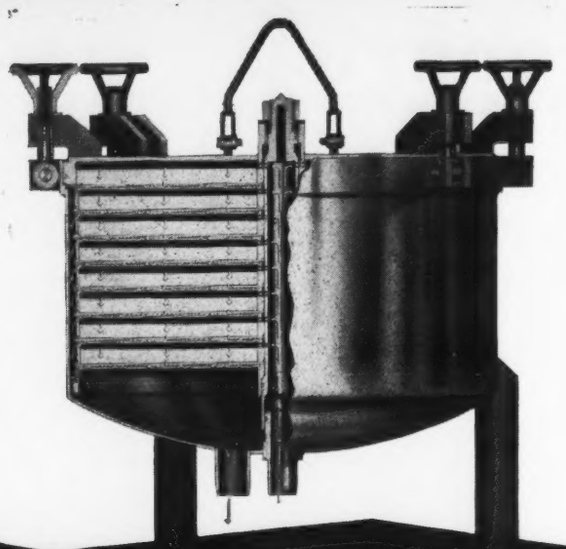
Koroseal—T. M. Reg. U. S. Pat. Off.

When inquiring check 4019 opposite last page



SIMPLEST, QUICKEST
horizontal plate filter
FOR RECOVERING CAKE

Quick to disassemble: Slip hoist hook through lift-ring . . . remove cover and plate bundle together. Take off compression nut. Then remove cover from plate bundle by the same lift-ring. Plates slide up and off central manifold. No tie rods save downtime. Reassembly just as easy. 18″ and 33″ plate diameters, ranging in filtration area from 7.4 to 250 sq. ft. Built to code requirements and can be code-stamped for 75 psig standard. Higher pressures available. With steam jacket if desired.

MAIL COUPON TODAY

Niagara FILTERS

A DIVISION OF
American Machine and Metals, Inc.
Dept. CP-657, EAST MOLINE, ILLINOIS

Niagara Filters Europe: Kwakelpad 28, Alkmaar, Holland.

☐ Send Bulletin with complete data on the new Niagara "Batch-Miser" Horizontal Plate Filter for handling _____

☐ Send details on renting a pilot model.

NAME & TITLE _____

COMPANY _____

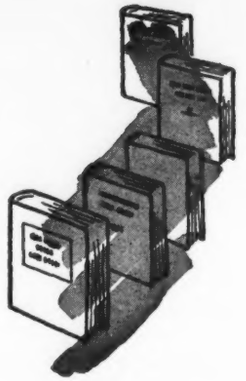
ADDRESS _____

CITY _____ ZONE _____ STATE _____

SPECIALISTS IN LIQUID-SOLIDS SEPARATION

When inquiring check 4020 opposite last page

Recent Books



Chemistry of Carbon Compounds, Vol. III, Part B Aromatic Compounds

Reviewed by GEORGE M. TOFFEL
Associate Professor of Chemistry
University of Alabama

This book is the second part of Volume III of the excellent series on chemistry of carbon compounds, edited by Dr. E. H Rodd. It completes the description of important benzene derivatives containing a single aromatic ring, as well as derivatives containing several rings or condensed nuclei in the widest sense. Chapter XIX deals with pseudo-aromatic compounds — the tropolones in particular. Chapters XX through XXII discuss aromatic compounds containing condensed nuclei. Descriptions include condensed systems with five rings, and systems of six or more rings. A description of some compounds containing seven- and eight-membered rings concludes the presentation.

Text contains eleven chapters, starting with Chapter XI on quinones and related compounds in the benzene series. Twelve contributors are listed; burden of making the drastic selection of material on aromatic chemistry is largely that of Dr. W. J. Hickenbottom. In some cases, very recent work was added at the proof-stage of the publication.

Order of presentation in this book as well as others in this series is essentially that of Richter, but this work represents a complete rewriting. Dr. Rodd states, "When the reader has grasped that, by a somewhat broad extension of definitions, all organic compounds other than hydrocarbons are regarded as derived from the alcohols and their oxidation products he will have little difficulty finding his way about these volumes." This series has already become a standard reference work on organic compounds with two volumes still to be published. Abundance of neat, clear formulas greatly facilitates the reading of this book.

To give an authoritative review of the entire book would require one to use the book for several years. Sections of literature familiar to this reviewer have been covered in an excellent manner. References to papers on the mechanisms of reactions that deal with those described in the text should be useful and are given throughout the book. The wealth of factual material, references to original writings, and surveys of modern ideas presented in this series should win the gratitude of chemists the world over.

To obtain "Chemistry of Carbon Compounds, IIIB, Aromatic Compounds" remit $25 direct to Elsevier Press, Inc., Dept. CP, 402 Lovett Blvd., Houston, Texas. When inquiring specify 4021 opp. last page.

Documentation in Action

Reviewed by D. S. DAVIS
Coordinator, General Engineering Studies
University of Alabama

For sheer stimulation, one could look a long while before he could find anything to equal this 471-page account of the 1956 conference on "Documentation in Action," edited with competence and sympathy by Jesse H. Shera, Dean of the School of Library Science, and his associates, Allen Kent and James W. Perry, all of Western Reserve University. If you're interested in communications — who dares to neglect this all-important field in these days? — you'll find William N. Locke, Norman T. Ball, Chester L. Bernier, and Thyllis Williams at their best in chapters devoted to language as it concerns machines, classification, indexes, and engineering, respectively.

H. R. J. Grosch of General Electric doesn't pull his punches when he discusses, with

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

engaging humor, men, information, and automation in decision-making processes. S. N. Alexander, of the National Bureau of Standards, draws on Al Capp's Lower Slobovians for a crystal-clear analogy when he tells us seriously about machines for retrieving and correlating recorded information. Not to be outdone, Margaret E. Egan of Western Reserve waxes specific and almost lyrical when she outlines education for librarianship of the future. There's more, much more; all of it is straight from the shoulders of those who know most about centralized abstracting services, analyzers, and additional items that are as bright, fresh, and practical as next year's car.

Areas for research, covered in a thought-provoking manner by the editors, bring to a close a sprightly, informative, and welcome volume that is a distinct credit to Western Reserve and to the publishers.

To obtain "Documentation in Action" remit $10 *direct to Reinhold Publishing Corporation,* 430 *Park Ave., New York* 22, *New York.*

pH Measurements, Their Theory and Practice

Reviewed by H. A. LAITINEN
University of Illinois

This little monograph by Victor Gold is intended for non-specialists, and its object is not only to describe basic experimental techniques for measurement of pH, but also to help towards better understanding of the correct significance of measurements and of limitations of the concept of pH.

Probably the outstanding feature of this 125-page work is its rigorous definitions of the quantities pcH, pwH, psH and the practical pH scales recognized in Great Britain and the United States, based largely on recommendations and standardization work of the U.S. National Bureau of Standards. A critical comparison of the various pH scales and their theoretical significance will be welcomed by many. The experimental treatment of electrometric pH measurements is relatively sketchy, as are the chapters on pH and Reaction Velocities (6 pp) and Solvents Other than Water (10 pp).

This book can be recommended particularly for research workers in fields such as biology, medicine, agriculture, and engineering as a concise and rigorous summary of the present status of the subject, and as a warning against indiscriminate interpretation of pH-meter readings in terms of hydrogen ion concentrations or activities.

To obtain "pH Measurements, Their Theory and Practice" remit $2.25 *direct to John Wiley & Sons, Inc., Dept. CP,* 440 *Fourth Ave., New York 16, N. Y. When inquiring specify* 4022 *opposite last page.*

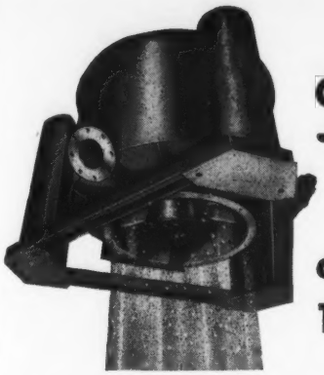
Handbook of Solvents Vol. 1: Pure Hydrocarbons

Author Ibert Mellan has divided this first volume on solvents into four sections. A 62-page introduction explains the origin of coal and petroleum, and the performance and significance of standard lab tests. Section II (96 pages) describes aliphatic hydrocarbons. Section III is devoted to aromatic hydrocarbons and is 74 pages in length. Section IV (10 pages) describes the terpenes.

Classification within each section is very logical and easy to use. Mellan lists and describes each class of solvents in order of ascending boiling points. Thus, solvents having similar chemical and physical properties are discussed together.

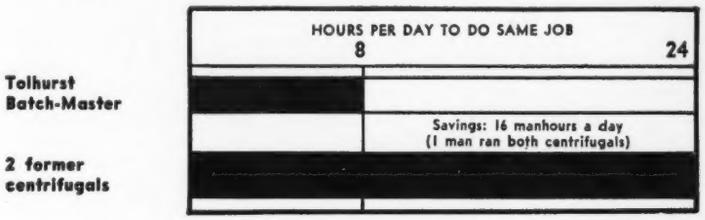
Page size is 9x6", and the volume has a total of 250 pages.

To obtain "Handbook of Solvents, Vol. 1" remit $6.50 *direct to Reinhold Publishing Corp.,* 430 *Park Ave., New York* 22, *N.Y.*



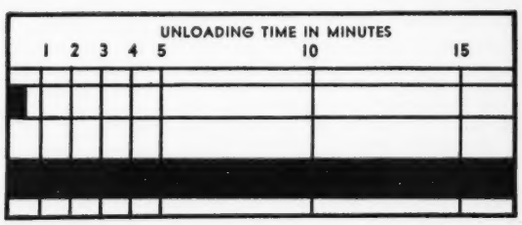
ONE Tolhurst centrifugal saves 16 manhours a day

A Tolhurst Batch-Master centrifugal is now processing the same volume of fine organics in 8 hours as 2 other centrifugals formerly did in 24 hours. These results, illustrated graphically, occurred in a leading chemical plant.


HOURS PER DAY TO DO SAME JOB
8
24
Tolhurst Batch-Master
Savings: 16 manhours a day (1 man ran both centrifugals)
2 former centrifugals

Unloads in 30 seconds

Tolhurst's hydraulic unloader and bottom discharge unload the solids in 30 seconds. Other batch centrifugals, under identical conditions, take 15 minutes or more.


UNLOADING TIME IN MINUTES
1 2 3 4 5 10 15
Batch-Master with hydraulic unloader
Other batch centrifugal with manual unloading

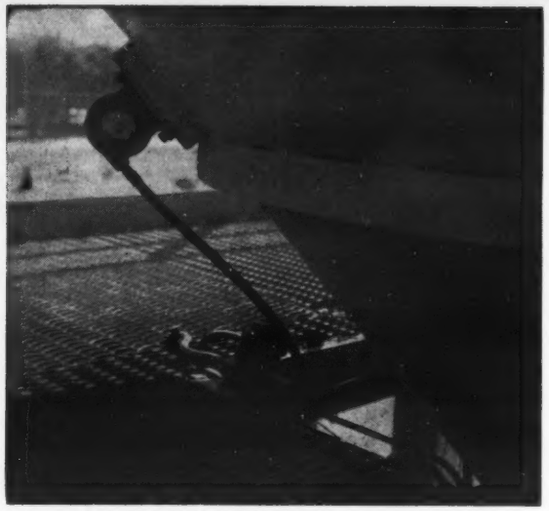
MAIL COUPON TODAY

Tolhurst CENTRIFUGALS
A DIVISION OF
American Machine and Metals, Inc.
Specialists in liquid-solids separation
Dept. CPT-657, EAST MOLINE, ILLINOIS

Send your new free 4-page Bulletin TC-14-56 giving full data on Batch-Master Centrifugal.

NAME AND TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

When inquiring check 4023 opposite last page



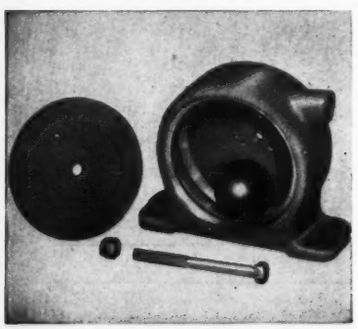
Typical AiroViber vibrator installation to keep bulk materials moving.

Low cost AiroViber speeds movement of bulk materials by trouble-free vibration

Operates quietly, effectively in wide range of temperatures; requires no maintenance

Trouble-free—External vibration for effective movement of bulk materials in loading, unloading, moving, packaging, processing, grading or separating is now available to you in the low cost AiroViber vibrator. Simple design of AiroViber involves only one moving part and ends necessity of down time for periodic maintenance or lubrication. It also includes a noise reducing design that eliminates annoyance of sounds often experienced in ordinary types of vibrators.

AiroViber's one-moving-part construction assures you of continual operation in wide range of temperatures. It will also start and operate at all times and is not affected by humidity.



AiroViber's simple design assures trouble-free vibration.

How It Operates

Vibration necessary to keep materials from jamming, arching or hanging up in bins, hoppers, chutes, feeders ... is created by the AiroViber vibrator through action of a single heavy steel ball blown by compressed air around a hardened and ground steel track in the housing. A strong centrifugal force developed by the weight of the ball is then transmitted by the vibrator through its mounting into the object being vibrated.

Installation Is Easy

Because of its simplified design, AiroViber may be installed quickly and easily. And, since no upkeep is required, you can install this vibrator in hard-to-get-at locations... fully confident that it will operate for a long time without lubrication or maintenance. Special line oilers or air filters are not needed ... merely hook up an air hose large enough to deliver air specified for the unit you select.

Find out how AiroViber vibrators can save you money and time in moving bulk materials. For illustrated literature and address of nearest distributor, write Viber Company, 726 South Flower St., Burbank, Calif., Dept. 19-G-6.

VIBER

VIBRATORS SINCE 1931

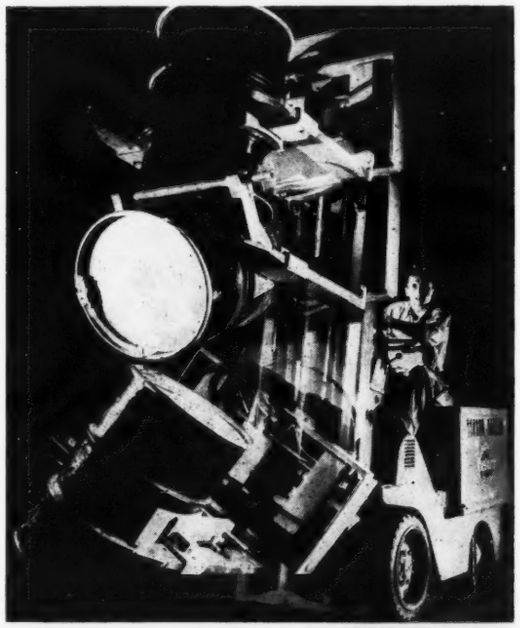
When inquiring check 4024 opposite last page

How many drums do you want to move at one time? How do you want to move them? A fast and efficient method is by lift truck, whether it is moving single or many drums at one time, for stacking or emptying . . . palletized or not. Here is a round-up of various attachments that will quickly . . .

Increasing the versatility of standard equipment is a recognized key to cost cutting. One method of getting this versatility in material handling is using attachments that will easily and quickly convert a standard truck into a drum-handling machine.

For instance, the operator in the photograph immediately below is able, with the use of a combination 4-way carriage and drum clamp, to pick up and rotate a drum in any direction. This makes possible pickup and stacking from or to any load position. Also, for dumping and pouring, the drum-clamp attachment permits forward tilting 45° below horizontal.

Forks can be moved in opposing directions for clamping and unclamping different size drums, or in the same direction for side-shifting. With side-shifting, truck need not be maneuvered accurately for pickup or

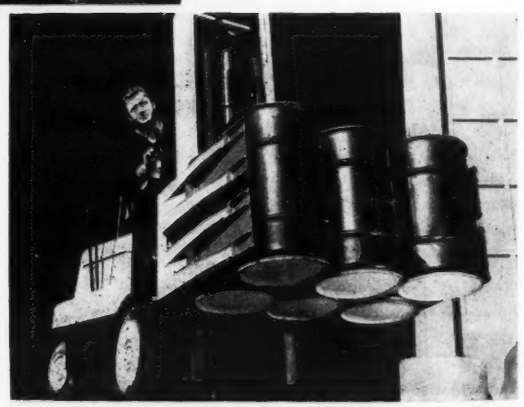


This attachment gives both single and multiple drum-handling in either vertical or horizontal position. Flexibility is achieved by mounting pressure plates on the spring steel "fingers" of basic arm structure. Arrangement permits even load distribution between "fingers" and allows pressure plate to tilt in conformance with package or load shape

Check 4026 on Reader Service Slip

With this attachment, operator can pick up and rotate drum in any direction for stacking or emptying

Check 4025 on Reader Service Slip



Convert standard trucks into drum-handling machines

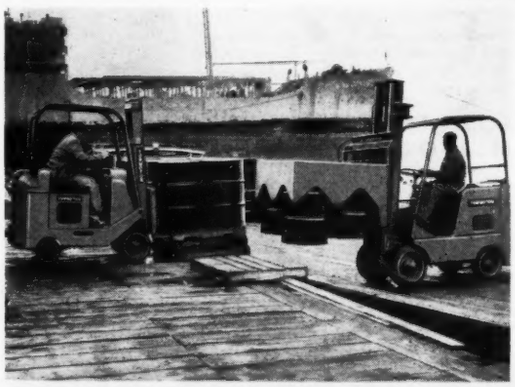
stacking in precise location.

There are many more attachments that will fill various desired jobs. The others in this pictorial round-up show some of the other types of drum-handling attachment and their applications.

(For more information on these devices contact The Material Handling Institute, Inc., Dept. CP, One Gateway Center, Pittsburgh 22, Pa. . . . or check corresponding numbers on form opposite last page.)

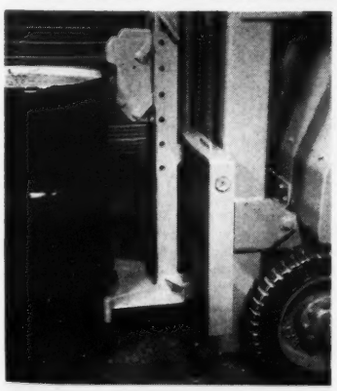
Hydraulic drum attachment for rotating of drum. This device is used where forward tilting or intermittent conversion to forks is not required

Check 4027 on Reader Service Slip



Another method for multiple drum-handling is with these two attachments. Truck on left handles palletized loads of drums, while one on right uses a drum carrier to pick up drums and double-tier them. Front of drum carrier can be used to push barrels into pickup position

Check 4028 on Reader Service Slip



Simple forkless attachment is entirely mechanical (no hydraulic requirements). It is designed to engage, transport, place, and stack any conventional drum, either open or closed. With this attachment, drums can be stacked or removed without disturbing adjoining drums

Check 4029 on Reader Service Slip

This single-barrel handling device can be easily attached by slipping onto forks and locking with pins. Spring-loading keeps clamps open for easy load engagement and permits them to conform snugly to drum contour

Check 4030 on Reader Service Slip

Gaylord engineers conduct impact tests to simulate effects of sudden starts and stops on corrugated-packaged products.

HOW PRE-TESTING CUTS SHIPPING DAMAGE

Your product packaged by Gaylord can take its first trip over the road of distribution inside our laboratories. As a member of the National Safe Transit Program, Gaylord conducts unsparing tests duplicating the actual hazards of shipment.

This is only one phase of Gaylord engineering research which helps reduce shipping losses in every major American industry.

Make sure your boxes are performance-proved before they get their travel orders. Call your nearby Gaylord engineer. He likes tough challenges.

Gaylord Boxes

CORRUGATED AND SOLID FIBRE BOXES
FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES
KRAFT BAGS AND SACKS

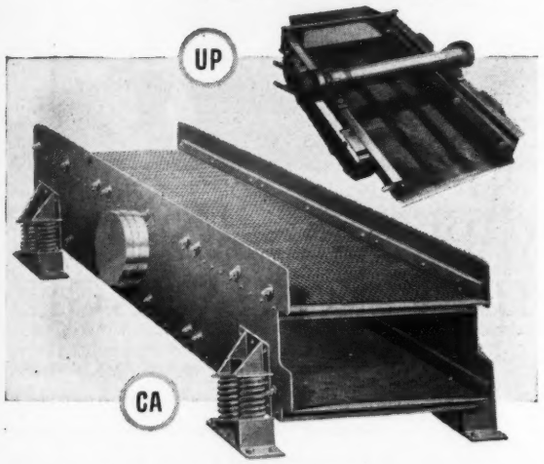
GAYLORD CONTAINER CORPORATION • ST. LOUIS
DIVISION OF CROWN ZELLERBACH CORPORATION

When inquiring check 4031 opposite last page

CHECK your material characteristics

✓	BONE DRY	✓	CLAYEY
✓	WET	✓	STICKY
✓	GRANULAR	✓	FLAKY

Then ✓ CHECK with LINK-BELT



Effective action of Link-Belt vibrating screens rapidly sizes any material

For any type material you handle there's a Link-Belt vibrating screen to match—the UP for light to medium-weight materials . . . the CA for medium and heavy-duty operations. Smooth, powerful action assures fast, accurate sizing, with vibration amplitude adjustable for maximum efficiency. Both screens are available with single or multiple decks. Get full facts from your nearest Link-Belt office. Ask for Book 2554 (CA) and 2377-A (UP).

These LINK-BELT accessories help maintain a clean screen

For positive prevention of blinding and plugging in the handling of damp, sticky, clayey materials. Link-Belt offers *electrically heated screen cloths*. And for applications where electric heating is impossible or impractical, Link-Belt's *bouncing ball deck* assures uniform cleaning action.

LINK-BELT

VIBRATING SCREENS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,510

When inquiring check 4032 opposite last page

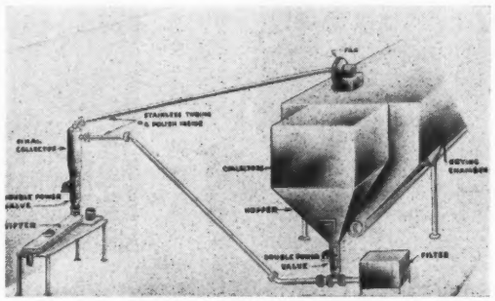
Cools and conveys powders to packaging areas . . .

sealed system is designed to handle powdered products from drying chamber, hopper

Uses: Transferring, while cooling at same time, powdered products from spray dryers, hoppers and bins to packaging areas.

Features: System is furnished with combination filtering and cooling section and will operate either with refrigerants or cold water. It can reduce product temperature to 100°F.

Description: Cooled filtered air picks up powder through a positive-acting valve. After



Packaged units include conveying piping, filter, cooler, suction fan, air valves, and separators

cooling and conveying it to packaging location, separation is effected by stainless steel separators. Powder is removed through second air valve, and separated air is returned directly to processing or drying chamber to insure recovery of all product. If necessary, equipment is available for reheating returning air.

Systems come as packaged unit and are fabricated from either mild or stainless steel. They are available in sizes up to 3000 lb-per-hr capacity.

(Powder cooler and conveyor systems are manufactured by Henszey Co., Dept. CP, Watertown, Wis. . . . or for more information check 4033 on form opposite last page.)

Push-button scale solves problem of weighing sticky materials . . .

gross weigher feeds directly into bag instead of hopper, eliminating material buildup

Uses: Weighing and feeding materials such as carbon black that tend to cling and build up along sides of feeding equipment.

Features: Average weighing accuracy is one to two ounces. Handles 25- to 100-lb bags. Has push-

PALMER-SHILE

Materials HANDLING EQUIPMENT

Engineered and Built to meet your needs

CONTROLLED PRECISION DUMPING or POURING

CONSULT P-S FOR THE BEST DRUM and BARREL TILT

Especially ideal for handling chemicals, solvents, powders, etc. Unit for handling carboys also available. Equipped with two safety type locking devices and all steel, welded yoke. Turns 360° through worm drive. Hand-operated chain drive or 12" O.D. hand wheel.

Item B-731 $217.50

LOADING and UNLOADING TRUCKS

CONSULT P-S FOR THE BEST DRUM and BARREL SLING

Item B-205 $20.15

Handles drums, barrels, kegs that have a lip. Excellent for handling draining of drums. Heavy welded chain and forged grab hooks. Weight approx. 8½ lbs.

CONVENIENT, SAFE HANDLING of LIQUIDS *with*

CONSULT P-S FOR THE BEST Combination TRUCK and DRAIN RACK loads automatically

DETACHABLE HANDLES

Item NS 506 DH (detachable handles) $61.80

Item NS 506 (handles welded to frame) $57.35

This dual purpose truck can be used to move barrels or drums and also serve as a drain rack. Available in two styles—handles welded to frame or with detachable handles that can be pulled out to conserve floor space. One set of handles can serve any number of trucks. Sturdy welded construction. Free-rolling 8" roller bearing wheels. Weight approximately 90 lbs.

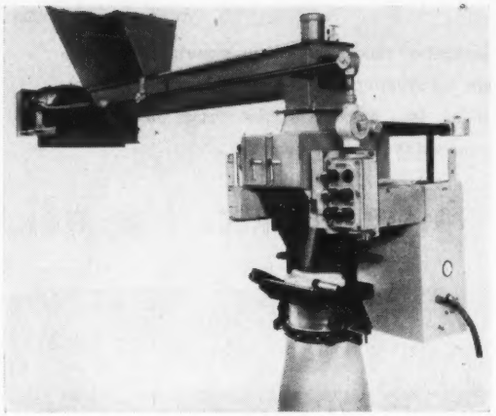
DESIGNED AND MANUFACTURED BY

Palmer-Shile Co.

16016 FULLERTON AVE., DETROIT 27, MICH.

BOSTON, Mass., CO 6-0570 • BURLINGAME, Calif., DI 2-0823 • CHICAGO, Ill., AUstin 7-8599 • CLEVELAND, Ohio, SU 1-3235 • DENVER, Colo., AL 5-3984 • FLINT, Mich., CE 8-6881 • FORT WAYNE, Ind., KE 5408 • INDIANAPOLIS, Ind., ME 3-2587 • LOS ANGELES, Calif., RA 3-3733 • MILWAUKEE, Wis., BRoadway 1-9860 • ST. LOUIS, Mo., PR 1-1474 • WHITE PLAINS, N. Y., White Plains 6-1354

When inquiring check 4034 opposite last page



Gross weigher offers automatic, distortion-free weighing of difficult adhesive materials

button control, automatic feed and bin-level switches, and choice of power feed mechanisms. Erratic discharge is eliminated.

Description: Scale feeds directly into bag suspended from weigh beam, rather than through a weigh hopper. Material is kept in motion until it falls into the bags.

Pressing "start" button opens air-operated radial gate at scale's inlet. As pre-set weight of material is received in bag, weigh beam moves toward balance. At balance point, inlet gate is closed and feeding stopped. Bag, held on spout by bag holder, is released.

Some optional features include explosion-proof electrical components, bin-level switch for maintaining material supply, subsidiary weigh beam for fractional pound weighings, motor-driven agitator in chute to stimulate even flow of sluggish materials, and stainless steel construction for corrosives.

(E-52 gross weigher is manufactured by Richardson Scale Co., Dept. CP, Van Houten Ave., Clifton, N.J. . . . or for more information check 4035 on form opposite last page.)

Tells how LP gas conversion cuts industrial truck costs

Carburetion equipment for converting industrial trucks to LP gas operation is shown and discussed in four-page bulletin. Features that enable reduction of operating and maintenance costs are pointed out. Photograph and schematic drawing show conversion kit. Detailed parts list with accompanying drawing, instructions, and specifications are included.

Form 657 is issued by Industrial Gastruck, Inc., Dept. CP, 2019 Dempster St., Evanston, Ill. When inquiring specify 4036 on form opposite last page.

HERE'S OPEN-ROAD PERFORMANCE
. . . plant-yard size

The Allis-Chalmers Model D is a full-fledged motor grader. It is used extensively on road construction and maintenance jobs where only the finest grading performance is acceptable.

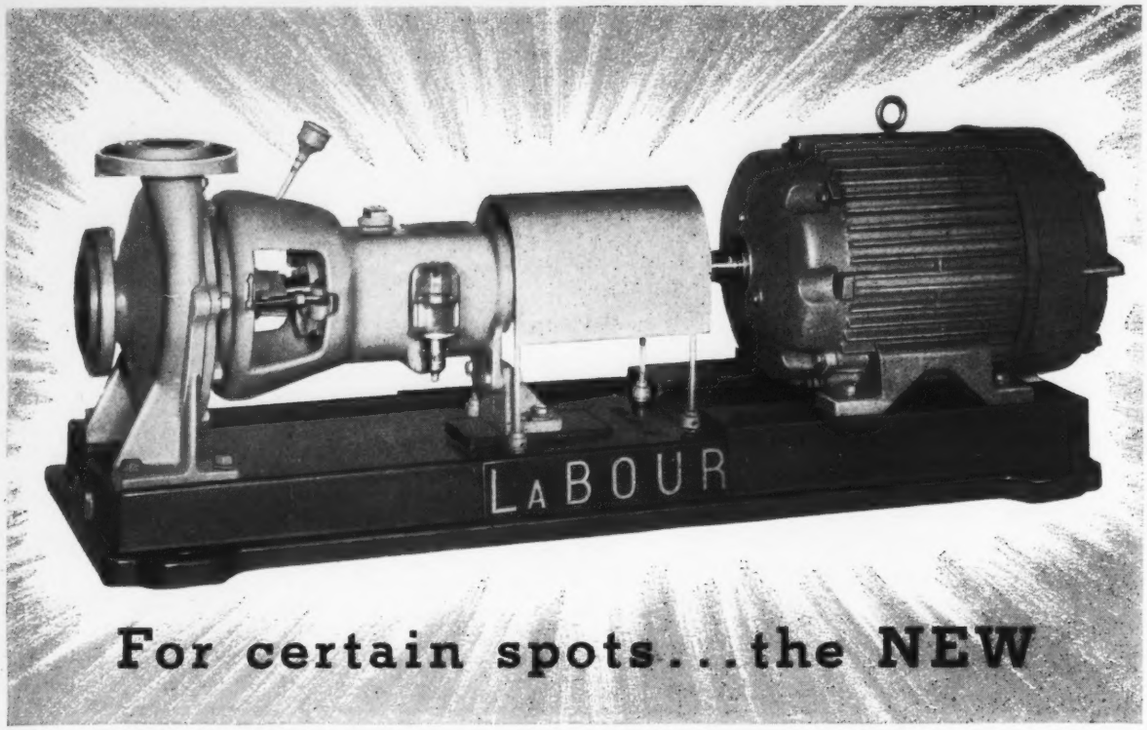
It has the basic design and performance features found in machines costing up to three times as much, but there is one important difference: The Model D is compact and maneuverable enough to maintain plant roads and yard areas where other graders cannot operate.

To add still further to its usefulness around industrial plants, the Model D may be equipped with a rear-mounted, ⅝-cu yd loader for stockpiling, loading and snow removal jobs. Optional cab offers year-round operator comfort.

Let your Allis-Chalmers dealer show you how the Model D can give you open-road grading ability in the confined areas of your plant yard. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*

When inquiring check 4037 opposite last page



For certain spots...the NEW

LaBOUR Type SZ

This newest member of the LaBour pump family has been created to deliver traditional LaBour dependability and long service life combined with new installation and maintenance arrangements which may be important in certain situations.

The casing of the SZ is integral with inlet and outlet passages and is independently supported on the base plate. If desired, a complete new drive unit with impeller may be installed without disturbing the piping connections or the motor.

Type SZ is a single stage non-priming centrifugal able to handle large quantities of air or gases mixed with the liquid. It uses a fully open impeller, and there are no sealing rings or closely fitted pumping parts. This pump is available in various corrosion resistant materials to meet practically any requirement.

Your copy of bulletin D-3 with full particulars on the SZ is waiting for you. Ask for it—today.

ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

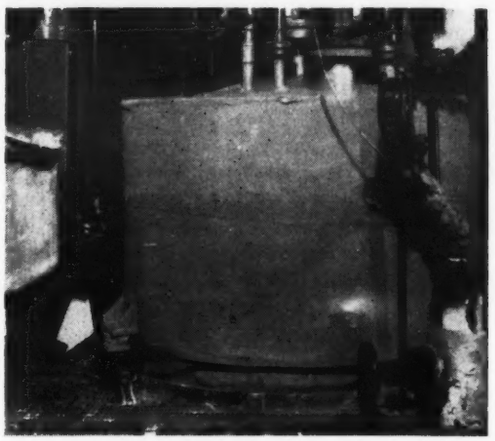
LABOUR

THE LABOUR COMPANY, INC. • Elkhart, Indiana, U.S.A.

When inquiring check 4038 opposite last page

Amount of reactants used in manufacturing sodium borohydride is extremely crucial. Metal Hydrides, Inc., mounts reaction vessel on load-cell weighing system as means of . . .

assuring accurate weight of



Reaction tank is supported on brackets resting on load cells (arrow). System gives accurate weighing of charge, critical to the reaction in producing sodium borohydride

Problem: Accuracy in a weighing system is a crucial factor in process for manufacturing a new hydride useful in synthesizing pharmaceuticals and conducting hydrogenation reactions.

The reaction for producing the compound — sodium borohydride, made by Metal Hydrides, Inc., Beverly, Mass. — depends upon ability of a weighing system to weigh initial charge accurately, and to match this weight with almost absolute accuracy in repeat runs.

Solution: Metal Hydrides installed a system where strain-gage load cells are fixed, integral parts of the reaction tank. Three "sandwich"-shaped brackets, welded to tank, serve as its only support. Each bracket in turn rests on a 2000-lb capacity load cell.

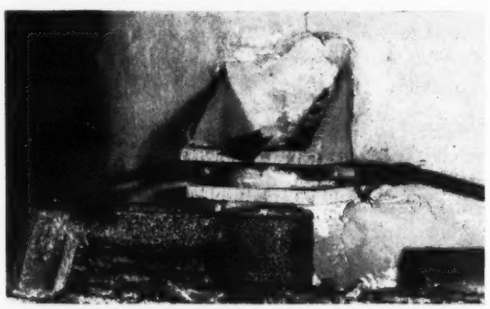
Impulses from cells are transmitted to instrument panel. Only initial weight of charge is read, but the system can give exact weight at any or all points of reaction. Weights are shown on an indicator mounted on the panel. Weight of tank is tared out in the indicator.

Because the cells are temperature-compensated and involve no moving parts, they function accurately over a wide range of operating temperatures.

Completely enclosed and sealed, the cells are unaffected by any moisture or gases that may be

of charge to reactor

Impulses from three load cells, transmitted to instrument panel, are added and presented as a total weight on indicator



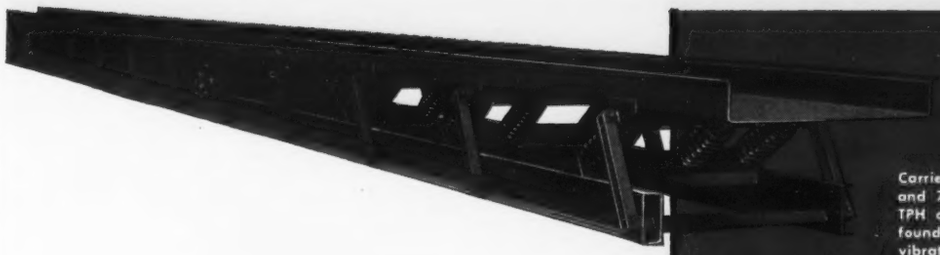
Coil (arrow), filling space in bracket, is an insulating pad through which cold water is pumped to reduce temperature in bracket

in the atmosphere.

Results: Weighing system has met operating requirements with an accuracy of ±0.25% in the weight of the initial charge. In repeat runs, system matches the weight of initial charge with an accuracy better than ±0.10%.

Metal Hydrides is so satisfied with the system that they are considering it for use in future installations.

(SR-4 tank-weighing system is manufactured by the Electronics & Instrumentation Division of Baldwin-Lima-Hamilton Corp., Dept. CP, 42 Fourth St., Waltham, Mass. . . . or for more information check 4039 on form opposite last page.)



HIGH-TEMPERATURE, HEAVY-DUTY

Carrier Conveyor 3' wide and 70' long, handling 150 TPH of red hot castings and foundry sand. 50 coil springs vibrate approximately 3 tons of weight. One 10 HP drive.

PROCESS WHILE YOU CONVEY WITH CARRIER ~~NATURAL-FREQUENCY~~ CONVEYORS!

Carrier Natural-Frequency Conveyors, Feeders, Shakeouts and other Vibrating Equipment have taken on some of the roughest, toughest products in America — are now conveying and processing them quickly and efficiently, *with an absolute minimum of maintenance and downtime!*

Carrier Natural-Frequency Vibrating Equipment works on a unique principle which substitutes the natural resonance action of rugged coil springs, for brute force. Where up to 90% of the power output of a "brute-force" conveyor may be required to operate its moving parts—and only about 10% to convey its load — substantially no more power is required to operate Carrier Natural-Frequency equipment empty, *than to run the motor alone!*

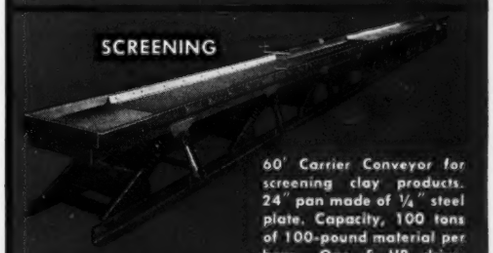
Whether you handle castings or crystals, sludge or sand, plastics or peanuts, it will pay you to get all the facts about Carrier Natural-Frequency Vibrating Equipment. Remember — Carrier developed the world's first really modern vibrating equipment . . . knows more about its *practical* industrial applications than anyone else. May we talk with you soon? Carrier Conveyor Corporation, 205 North Jackson Street, Louisville 2, Kentucky.

DRYING

Four 30' Carrier Conveyors for drying clay mix. Material is conveyed beneath bank of burners and is dried from 15% moisture to 9% or less. One 5 HP drive.

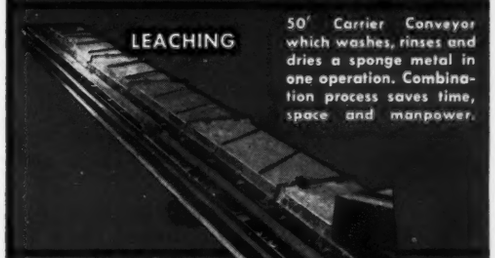
QUENCHING

18' Carrier Spiral Conveyor of stainless-steel construction, handling 1 TPH of hot pellets. Material is water-quenched—amount of quenching regulated by adjusting depth of water.



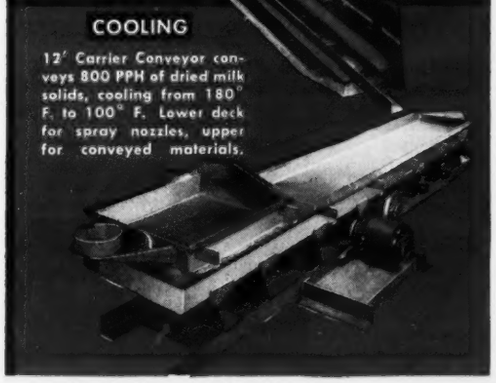
SCREENING

60' Carrier Conveyor for screening clay products. 24" pan made of ¼" steel plate. Capacity, 100 tons of 100-pound material per hour. One 5 HP drive.



LEACHING

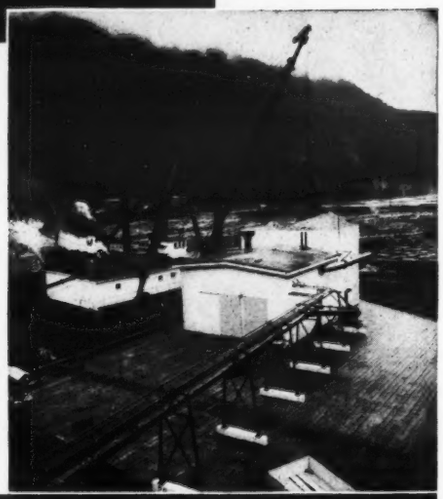
50' Carrier Conveyor which washes, rinses and dries a sponge metal in one operation. Combination process saves time, space and manpower.



COOLING

12' Carrier Conveyor conveys 800 PPH of dried milk solids, cooling from 180° F. to 100° F. Lower deck for spray nozzles, upper for conveyed materials.

When inquiring check 4040 opposite last page



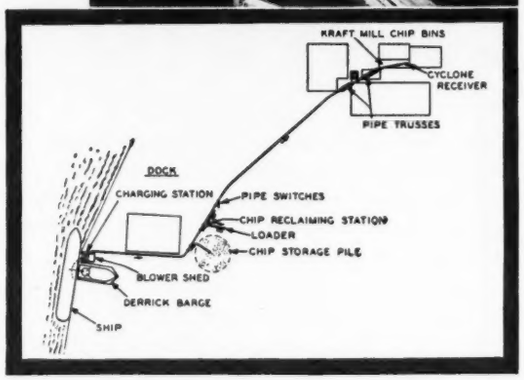
The Airveyor®

takes over

When the chips are down

at

CROWN ZELLERBACH
CANADA LIMITED



To move wood chips from unloading dock to processing, the Airveyor system has been put into operation, and has proved highly successful, at the Ocean Falls, British Columbia, Paper Mill of Crown Zellerbach Canada Limited.

The chips are transported to the plant dock by barge, unloaded by bucket derrick into a chip hopper, and then discharged by flight conveyor into a chip feeder. At this point, the Airveyor, powered by a diesel-driven blower, takes over. The chips are conveyed through a 16-inch pipeline extending 1760 feet to the chip loft over the digesters. It has a rated capacity of 60 tons per hour but has conveyed chips at a rate as high as 67 tons per hour.

Even with this rather unique application of the Airveyor conveying system, the experience of Crown Zellerbach parallels that of so many other companies once plagued by the problems of dry bulk-materials handling.

The Airveyor handles most dry pulverized or granular materials efficiently and economically. Send for details today as your first step toward faster, safer, cleaner conveying—at less cost. There is no obligation.

GENERAL AMERICAN TRANSPORTATION CORPORATION

Fuller
. . . pioneers in harnessing AIR

FULLER COMPANY
136 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Chicago · San Francisco · Los Angeles · Seattle · Kansas City · Birmingham

A-224
3259

When inquiring check 4041 opposite last page

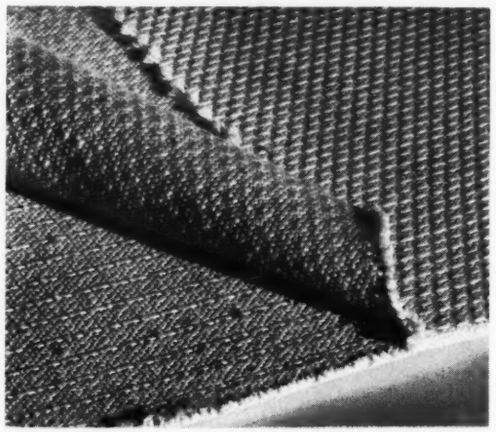
Conveyor belts are designed for small pulleys, rollers to 3½" diameter . . .

belt material is as flexible as woven belting and compares with canvas in strength

Uses: General-purpose conveyor belt to operate on pulleys or end rolls as small as 3½".

Features: Has flexibility of solid woven belting with strength and low elongation chracteristics of stitched canvas.

Description: Belts are sewn on ¼" centers and are inner-stitched on ½" centers. They can be used on either side, as desired.



Conveyor belt is sewn on ¼" centers and inner-stitched on ½" centers

Available in three and four plies with variety of widths, they are supplied in different lengths. Belts can be impregnated or coated with any normal treatment for stitched canvas or solid woven belting.

(Main/Rusco SC-18 conveyor belts are manufactured by Main Belting Co., Division of Russell Manufacturing Co., Dept. CP, 157 E. Main St., Middletown, Conn. . . . or for more information check 4042 on form opposite last page.)

Conveyor maintains top capacity at all times

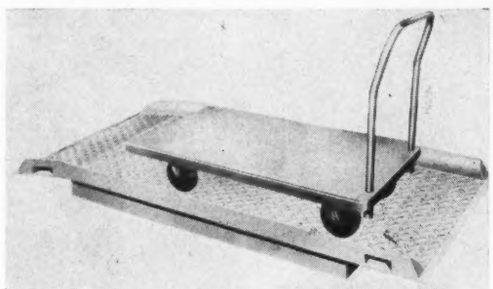
Oscillating conveyors that maintain top capacity at all times, while handling bulky parts or materials in light or heavy duty applications, are discussed in eight-page bulletin. Charts indicate capacity and drive selection. Dimensional drawings are included.

Book 2644 is issued by Link-Belt Co., Dept. CP, 307 N. Michigan Ave., Chicago 1, Ill. When inquiring specify 4043 opp. last page.

Safe, easy handling of materials with corrosion-, acid-resistant lightweight hand truck

Uses: Designed for safe, easy handling of heavy loads.

Features: Constructed of aluminum, truck is lightweight, corrosion- and acid-resistant, and free from sparking and splintering. It is also non-magnetic and easy to keep clean.



Radius adjustment permits aluminum hand truck to turn on its own axis

Description: Hand truck has formed, aluminum deck with rounded corners and adjustable wheelbase for short or long turning radius. Units are available in widths from 24 to 40" and lengths from 36 to 72", with capacities to 2000 lb.

(Met-l-ite aluminum hand truck is product of Voltz Brothers, Inc., Dept. CP, 2514 Indiana Ave., Chicago 16, Ill. . . . or for more information check 4044 on form opposite last page.)

"I'd like to compliment you on your excellent progress report, but I don't think it's necessary to conclude with 'be sure to read next month's exciting episode'!"

Thanks to George E. Pekarek, The Glidden Company, Cleveland

...increasing productivity without adding personnel!

Management men in every industry are giving productivity and profits—*as well as personnel*—a lift by integrating Towmotor mass-handling in all operations from receiving to delivery.

Every department benefits. More work gets done. And you don't need more men to do it because Towmotor fork lift truck operators are finding it's *fun* to multiply the handling of materials aided by 12 new Towmotor improvements like these:

- New functional body styling
- New pace-setting comfort features
- New "tight-spot" maneuverability
- New centralized easy-reach controls
- New positive-response hydraulic lift
- Towmotor-improved power steering

Some of the industry's most significant advances in fork lift truck design and performance are shown in Towmotor's latest bulletin #SP-23. See how they help supplement your personnel—permit your men to do a bigger day's work easier—give each operator the power to improve your plant's productivity and profits.

Write Towmotor Corporation, Cleveland 10, Ohio. We'll send the illustrated booklet immediately.

Leaders for 38 years in building Fork Lift Trucks and Tractors

TOWMOTOR THE ONE-MAN-GANG® -GERLINGER

Gerlinger Carrier Company, Dallas, Oregon is a subsidiary of Towmotor Corporation, Cleveland, Ohio

When inquiring check 4045 opposite last page

Pumps viscous liquids and semisolids without churning or chopping

New, air-operated *Ejectopump* works with a powerful yet gentle action. Whole grapes or even live goldfish can be pumped without crushing. "Handle with care" viscous materials such as latex are pumped without shear or turbulence. Because there's no churning or whirling action, *Ejectopump* is also ideally suited for pumping pottery slip, gritty sumps and other highly abrasive liquids.

Ejectopump needs practically no maintenance. Has no rotating or reciprocating parts, no bearings, no packing. Needs no lubrication. Quickly disassembled for cleaning.

Operation

Connect to any compressed air line 30 to 50 psi. Handles discharge heads up to 100 ft., with maximum suction 20 ft. Discharge rate may be precisely regulated. Pump is self-priming, may be installed above level of liquid pumped. Can be furnished in special alloys for pumping corrosives. Sizes: 1½", 2", 3", 4", 6".

WRITE TODAY for complete information and prices

FERRO CORPORATION
Supplies Division
4150 East 56th Street, Cleveland 5, Ohio

Ejectopump
COMPRESSED AIR OPERATED

When inquiring check 4046 opposite last page

Battery positive-plate capacities of 40, 60 and 120 amp-hour

Uses: For powering electric industrial trucks.

Features: Batteries come in three basic positive-plate capacities — 40, 60 and 120 amp-hour — to fill every motive need.

Batteries for electric trucks are available in three basic positive-plate capacities

Description: Construction features include acid-proof seal to eliminate wet covers and corrosion, rugged non-porous and dense grid, and regenerative oxide as active battery material.

Rubber shields cover groups of plates and protect separators during hydrometer readings. Self-leveling bridges maintain sediment levels to prevent sediment build-up and possible short circuits.

(Super Dreadnaught batteries are manufactured by Gould-National Batteries, Inc., Dept. CP, Trenton 7, N.J. . . . or for more information check 4047 on form opposite last page.)

Describes, pictures high-capacity dry-material feeder

Four-page bulletin describes advantages, principles of operation, and mechanical controlling device of high-capacity, dry-material feeder. Dimensional drawings, cutaway views, and photographs of typical installation fully explain this belt gravimetric feeder and its rate-control mechanism, designed to handle over 3000 lb per minute.

Bul 35-N62 is issued by Omega Machine Co., Dept. CP, 345 Harris Ave., Providence, R. I. When inquiring specify 4048 opposite last page.

For more information on product advertised at right, specify 4049 . . . see information request blank opposite last page.

His enthusiasm puts you in the driver's seat

We've learned one thing about drivers in the process of building over 250,000 lift trucks. An *enthusiastic* driver can make a good truck *look* good. How do you get an enthusiastic driver? By giving him the new *Clarklift*, a truck he's *sure* to like. It's a combination that you know will result in superior truck performance.

We're sure the new *Clarklift* is the best performing truck on the market today. We're equally sure of driver enthusiasm. Thousands of design and test hours stand behind this assurance to you. So when you match his enthusiasm with the finest performance in industrial trucks, it's pretty obvious—you're in the driver's seat too.

Industrial Truck Division
Clark Equipment Company
Battle Creek, Michigan

CLARK® EQUIPMENT

Can you "pay for" a magazine like this?

with a $3.00 or $5.00 subscription?

This magazine costs more than $40.00 per year

Maybe you've thought publishers make money on a $3.00 or a $5.00 subscription . . . that that is why they ask you to subscribe.

No, it's not true . . . your $3.00 or $5.00 fall far short of "paying" for *any* really good business magazine.

The costs of printing, paper and postage alone usually exceed subscription prices. Editorial costs and other expenses run to many times that amount. And usually it costs more just to sell such subscriptions than they bring the publisher in dollars. So, the publisher actually "loses money" on such sales.

Then, why? . . . yes, *why* do some publishers charge a nominal rate for a subscription . . . but other publishers send their magazines without charge?

Well, the "paid-subscription" magazine gets a lower postage rate than does the "non-paid subscription" magazine. Some publishers feel this postal advantage is important. So they charge a "token fee" as a subscription price. And so win a lower postage rate.

But—whether you pay nothing, or such a "token fee," you — the reader — do not *really pay* for the magazine's service.

No—advertisers pay the bills . . . and so, logically, advertisers *demand* the best possible coverage of the important, key men of the field. That means folks like you, who exercise buying power.

CHEMICAL PROCESSING "hand-picks" its readers—for best, effective circulation . . . and sends the magazine to these key folks, without charge.

You see, you simply can't get maximum coverage of important folks by trying to force them to buy subscriptions. Such men, limited in numbers, are scattered all over the U.S.A.; travel and/or direct mail, cost money; a large share "forget to renew" each year; and, no matter how much time, money and pressure you put on them, there are always some important men who will never buy.

You don't "pay"—CHEMICAL PROCESSING gets better circulation. So, as you can see, a subscription price is at best but a "token payment." You don't really pay for any magazine with $3.00 or $5.00.

But, CHEMICAL PROCESSING gets the best, most effective circulation coverage by "hand-picking" the right readers. This gives values to advertisers which they can't possibly get in any other way.

That's why . . . CHEMICAL PROCESSING hand-picks only qualified readers . . . Men Who Manage chemical processing plants . . . presidents, partners, plant managers, foremen, engineers, chemists, directors of research, etc. Then the editors make the magazine so interesting, so valuable, these folks want to read it.*

That's why CHEMICAL PROCESSING spends many thousands of dollars on each issue — to give you this service costing more than $40.00 per year . . . without charge . . . as *you* are an important reader in the chemical field.

No, you can't "pay for" any good business magazine with $3.00 or $5.00. Whether you receive a "paid magazine" or a "non-paid magazine" you are still enjoying a valuable service — whose cost is far above any price you paid for a subscription.

**Every issue proves this qualified readership . . . by unequalled response from these key readers. May we show you the evidence?*

Chemical Processing

PUTMAN PUBLISHING

published by: Putman Publishing Company

also publishers of:
FOOD PROCESSING
INDUSTRY POWER
FOOD BUSINESS

BPA
NBP

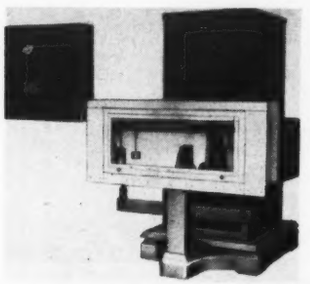
"Executive Magazines for Industry"

Accurately pre-weighs, feeds dry bulk material . . .

material flow is electronically controlled

Uses: For providing close control in feeding bulk materials into chemical and other industrial processes.

Features: Machine supplies accurately fed (to within less than 1%) pre-weighed batch of material at predetermined rate over



Material flow through weigh-feeder machine is electronically controlled

predetermined period of time. Material flow through machine is electronically controlled — no mechanical linkage between scale and feeder.

Description: Batch feeder consists of supply hopper equipped with an electromagnetic vibrator mounted over an electromagnetic vibratory feeder. All components are enclosed in dust-proof sheet metal cabinet and mounted on beam type scale. Scale beam, poise, totalizer, and other scale elements are separately housed. Control box can be remotely located.

Models available range in output from 1¼ to 25 lb per hr, 2½ to 50 lb per hr, 5 to 100 lb per hr.

(Dry chemical weigh-feeder machine is product of Syntron Co., Dept. CP, Homer City, Pa. . . . or for more information check 4050 on form opp. last page.)

A twin-tired truck prevents one tired driver

Take a look at this new *Clarklift*. Notice the back and front wheels are the same diameter! Your drivers can tell you this permits a much smoother ride for them *and* the load. These big rear wheels won't drop into every little depression in the floor as small wheels do.

On the new *Clarklift*, equal-sized wheels not only smooth out bumps, but take the groan out of steering. One lever on the steering column controls all lift and tilt action. There's a wide easy-moving brake pedal. No clutch. And when the driver settles down into that roomy, adjustable foam rubber seat, he won't want to leave it. It's no secret . . . *he* will like the *Clarklift* and *you'll* get more work from it.

Industrial Truck Division
Clark Equipment Company
Battle Creek 9, Michigan

CLARK® EQUIPMENT

For more information on product at left, specify 4051 . . . see information request blank opposite last page.

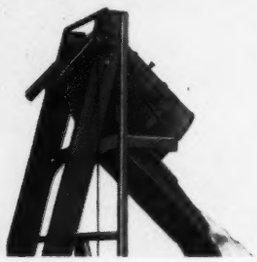
Here's a REAL LABOR SAVER!

THE CESCO DUMPER

Just Press a Button . . .

IT LIFTS

. . . and DUMPS



Provides Easy, Safe Loading of BINS • BATCHERS • MIXERS

HANDLES DRUMS, BAGS, BULK, BARRELS and BOXES

Speed up materials handling with Cesco Skip-Hoist Dumpers. They lift, upend and dump up to 100 loads per hour, and have a capacity of up to 3000 lbs. Available in single or multi-purpose portable models in standard height from 4 to 15 feet. Stationary models to 20 feet.

Dumpers Engineered to Meet Special Applications.

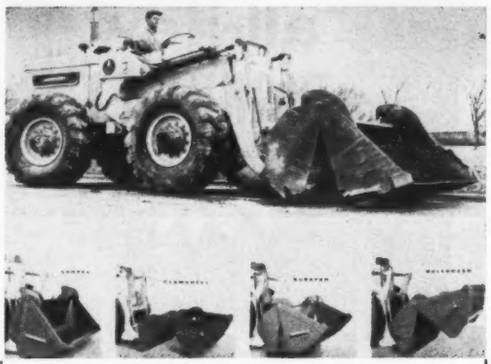
Write for complete catalog

ESSEX CONVEYERS, INC.
165 Franklin Avenue, Nutley 10, N. J.

COLSON EQUIPMENT & SUPPLY CO.
1317 Willow Street, Los Angeles 13, California

CESCO DUMPERS

When inquiring check 4052 opposite last page



Multi-purpose bucket-attachment

. . . fits manufacturer's line of four-wheel-drive tractor-shovels. Attachment can be used as shovel, clamshell, scraper, and bulldozer (shown left to right in lower part of photo).

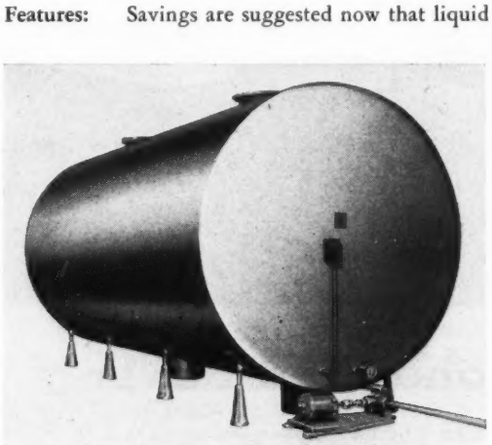
("4-in-1" bucket for tractor-shovel is available from The Frank G. Hough Co., Dept. CP, Libertyville, Ill. . . . or for more information check 4053 on form opposite last page.)

Automatic systems handle liquid wax in coating and sealing . . .

method takes advantage of lower initial costs of liquid wax over slab wax

Uses: Equipment and complete systems for handling liquid wax in coating and sealing operations.

Features: Savings are suggested now that liquid



Storage tank for a typical liquid wax system

wax can be obtained from refineries at less cost than palletized or packaged wax. Steam required for maintaining liquid system is reported to be less than that used for melting slab wax.

There's a heavy conveying system atop these Neff and Fry Bins

SUPER-CONCRETE STAVE STORAGE BINS

A continuous reinforced concrete roof on the six 20' x 52½' bins carries a big screw conveyor with piers, chutes, etc. Observe that there are no additional supports from the ground. The bins themselves support the entire load.

This strikingly proves the load-bearing strength of Neff & Fry Bins. Of course, the bins also have the lateral strength to contain 4,000 tons of grain.

The walls of Neff & Fry Bins are constructed of Super-Concrete Staves. For a complete understanding, read our folder, "Bins With the Strength of Pillars." Ask for it now before you forget.

NOT EXPORTED EXCEPT TO CANADA AND MEXICO

THE NEFF & FRY CO.
166 ELM ST. • CAMDEN, OHIO

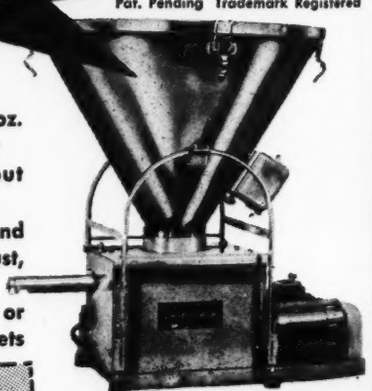
When inquiring check 4054 opposite last page

New! Vibra Screw METERS SOLIDS LIKE LIQUIDS

Pat. Pending Trademark Registered

with unparalleled accuracy!

★ Continuous flow rates from 1 oz. per hour to 100 tons per hour
★ Dust-free operation without bridging or flooding
★ Accuracy with simplicity and ruggedness—unhindered by dust, dirt or corrosion
★ Handles all materials, sticky or free-flowing—powders or pellets



Vibra Screw

P. O. BOX 62, WILLISTON PARK, N. Y.

Low cost Pilot - Laboratory model now available!

Territories Open For Manufacturers' Representatives

Write to Dept. "C" for latest bulletins

When inquiring check 4055 opposite last page

DARNELL

Always SWIVEL and ROLL

CASTERS AND WHEELS

for maximum long life, minimum maintenance

RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by zinc plating, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Quick grease-gun lubrication provides easy maintenance.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

Write for your free copy of this important book **today**

Consult the yellow pages of your telephone directory

DARNELL CORPORATION, LTD
DOWNEY (LOS ANGELES COUNTY) CALIFORNIA
60 WALKER STREET, NEW YORK 13, NEW YORK
36 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

When inquiring check 4056 opposite last page

Description: Typical liquid-wax installation consists of insulated tank, or tanks, in which coils and automatic controls maintain proper wax temperature. Additional equipment includes water sumps, water decanting valves, thermometers, and gaging systems for inventory control. Water for heating coils is provided by automatic water heaters using steam from plant lines. Overheating of wax is thus prevented. Liquid wax passes through strainers and heated lines under pressure to points of use. Bypass arrangement assures uniform pressure and temperature at outlets and provides agitation in storage tanks.

(Complete liquid-wax systems are designed and manufactured by Stainless Products Corp., Dept. CP, Belding, Mich. . . . or for more information check 4057 on form opposite last page.)

Presents electrical equipment for cranes and monorails

Description of electrical equipment for crane and monorail systems includes pictures and rating charts. Items listed in 12-page catalog are copper-wire, figure-8-bar, T-bar and enclosed-duct conductors.

Bul E-156 is issued by Industrial Crane & Hoist Corp., Division of Borg-Warner Corp., Dept. CP, 1536 S. Paulina St., Chicago, Ill. When inquiring specify 4058 on form opposite last page.

Aren't you glad you were wearing your safety helmet?"

Thanks to James V. Redding, The Central Pharmacal Company, Seymour, Indiana

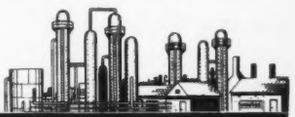
HOW! PUMP USERS!

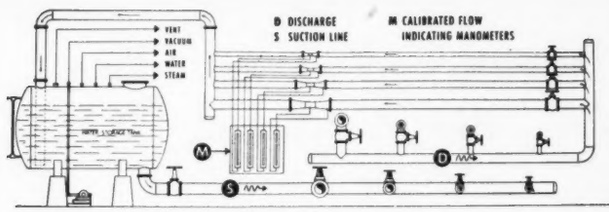
Would you like to have your Process Pumps pre-tested under service conditions?

★ Dean Brothers modern test circuit is a closed, recirculation system as are many process systems. This arrangement permits simulation of process conditions for proving pump performance. Modern instruments produce reliable data on head, capacity, NPSH and efficiency.

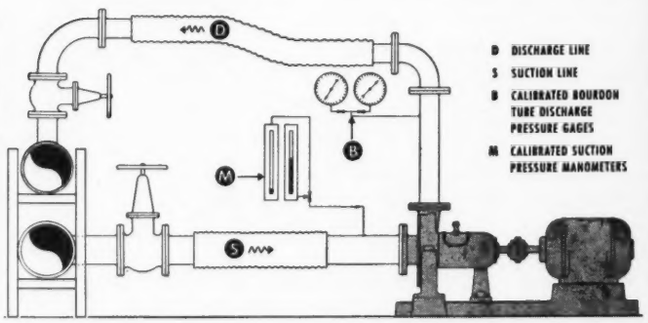
Dean Brothers standard centrifugal process pumps are tested on the same system used to provide reliable research information.

The Best is our Standard





▲ *Schematic Flow Diagram of Dean Brothers Test Floor—a closed system with connections to surge tank for vacuum, air pressure and steam heat.*

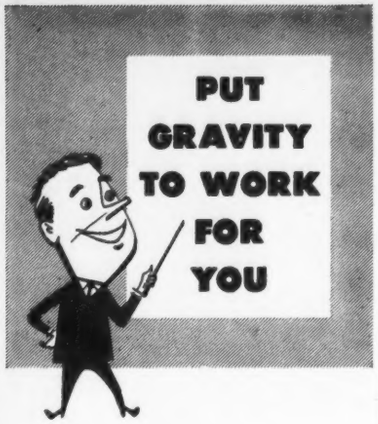


▲ *Schematic Diagram showing pump installed for test.*

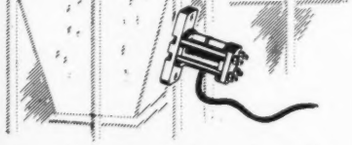
WRITE FOR SPECIFIC APPLICATION OF OUR TEST EQUIPMENT TO YOUR REQUIREMENTS

DEAN BROTHERS PUMPS INC.
EST. 1869
323 West 10th St., Indianapolis 7, Ind.

When inquiring check 4059 opposite last page



Gravity is the cheapest prime mover available. It will empty bins, convey materials, aid in transportation . . but it can't solve the problem of handling dry or viscous materials.



It takes the engineered application of Cleveland Vibrators to break up the frictional forces which cause adhesion and jamming. Vibration keeps materials moving in a full and controlled flow.

Cleveland Vibrators can be installed on all types of equipment for handling and processing chemicals. We will be happy to give you detailed data for your specific application, or a catalog for your reference files.

Air or Electric
Portable or Permanent
Silent or Standard

2706 Clinton Avenue • Cleveland 13, Ohio

When inquiring check 4060 opposite last page

Uses of hand truck attachment highlighted in folder

Pocket-size folder of six pages highlights uses and features of hand truck attachment designed for easier, safer handling of bulky, heavy containers. Drawings show typical applications. Information on safety features, types of equipment available, operation, and prices is included.

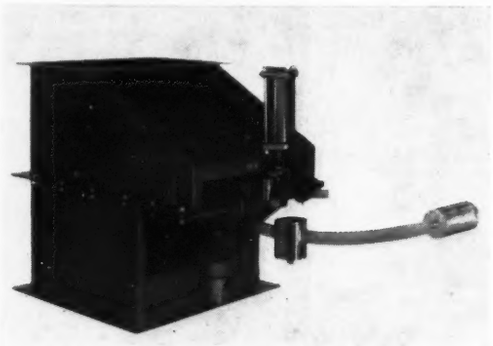
Folder on hand truck attachment is issued by Universal Hand Truck Attachment Co., Dept. CP, 633 S. La Brea Ave., Los Angeles 36, Calif. When inquiring specify 4061 on form opposite last page.

No outside power required — feeder has counterbalance to control rate . . .

fall of material on impact pan furnishes power to position feed control gate

Uses: Continuous gravimetric feeding of free-flowing materials.

Features: Easy installation, since no electrical connections must be made (unless automatic shut-off is required). Feeder is light-weight, doesn't use much headroom. Mechanical system gives simple, accurate feed-rate control.



Feed rate is adjusted by changing position of counterweights on scale beam

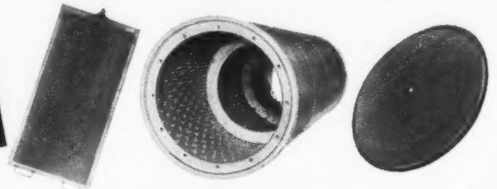
Description: Self-powered feeder operates on principle of balanced weights in which the force of fall of material being fed onto impact pan is balanced against preset counterweight. When counterweight is moved to desired feed rate, feed gate is opened and impact pan brought into position below the opening. Force created by material passing from hopper (or other containers) tends to balance counterweight. (Increase in force narrows gate opening, while decrease widens it.) Seven sizes are available which offer feed rates from 5 to 2000 lb/min (@ 48 lb per cu ft).

Wire Cloth-Filter Cloth
TO YOUR EXACT REQUIREMENTS

in Rolls or Cut Pieces

WIRE CLOTH all standard grades, for Industrial and Paper Mill use, all weaves, widths to 244", corrosion-resistant alloys.
FILTER CLOTH all standard weaves and densities, woven in corrosion resistant alloys, extra wide.
NEVA-CLOG perforated metal sheet filter medium—strong, rigid, smooth, non-clogging.
MYKRO-PORE electrodeposited metallic filtering or straining medium with retention to 20 microns.
MICRO-MESH high shute count filter cloth up to 1500 wires/in.—retention to 10 microns.

in Fabricated Components



"RIM-LOK" leaves for stationary leaf batch pressure filters, vertical or horizontal shell.
Filter leaves (bare or covered) for all other standard pressure filters.
Custom-made leaves and elements to your special design.
Screens—Strainers—Cylinders—Vibrating Screens
Discs—Process Equipment or components—Trays
Inquiries invited. Write for Catalog

MULTI-METAL WIRE CLOTH CO., INC.
1356 GARRISON AVENUE • NEW YORK 59, N. Y.

When inquiring check 4062 opposite last page

alphabetical index on page 237

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 237. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader in finding what you want . . . in a hurry!

Throat, gate, and impact pan are faced with stainless steel.

Automatic shut-off (optional) permits automatic starting and stopping of feeder and can be synchronized with other plant equipment. It will close feeder in event of power failure.

(Series A-619 self-powered feeders are manufactured by Wallace & Tiernan Inc., Dept. CP, 25 Main St., Belleville 9, N.J. . . . or for more information check 4063 on form opposite last page.)

Added line of industrial tractors uses high-torque drive . . .

power is from electric motor driven by generator directly coupled to gasoline engine

Uses: Hauling plant tractor-trailer trains.

Features: Trucks incorporate high-torque drive principle used in railroad switch engines. Manufacturer reports fuel savings resulting from drive's high efficiency, and reduced maintenance costs by elimination of clutches, torque converters and mechanical or fluid transmissions.

Tractor uses high-torque principle found in railroad switch engines

Description: Drive is from high-torque electric motor powered by generator direct-coupled to gasoline engine. Power is applied by increasing engine rpm with foot accelerator.

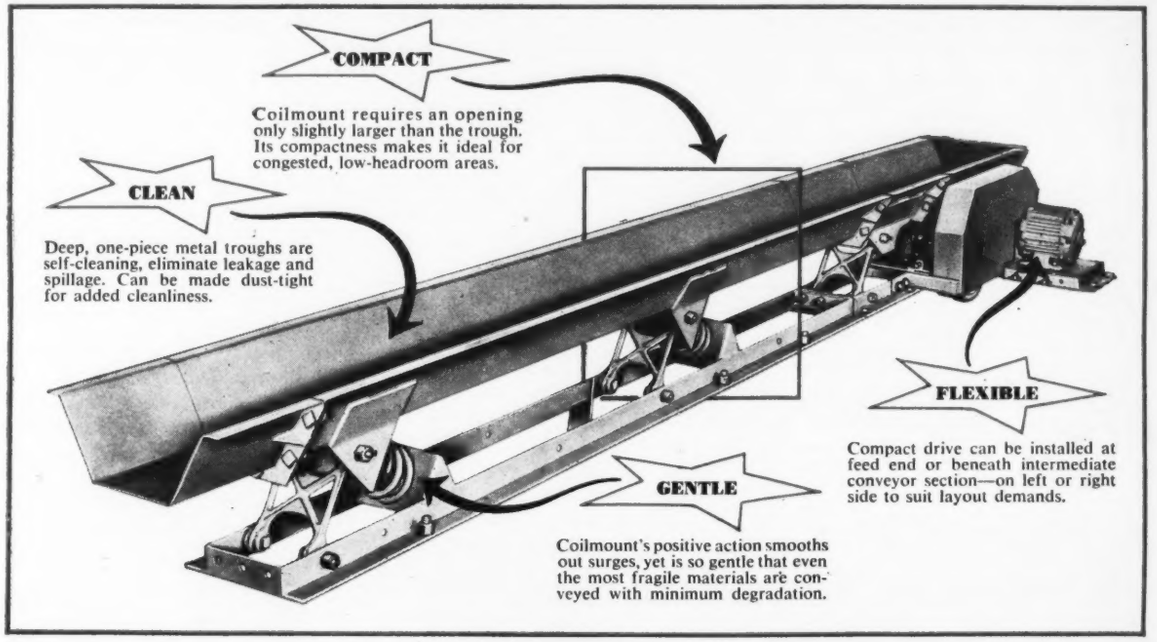
Tractor has automobile-type controls and four-wheel suspension. It has drawbar pull of 600 lb normal, 2000 lb ultimate. Overall length is 79-5/8".

(Model GLT Dynamotive four-wheel tractor is manufactured by Automatic Transportation Co., Div. of Yale and Towne Mfg. Co., Dept. CP, 149 W. 87th St., Chicago 20, Ill. . . . or for more information check 4064 on form opp. last page.)

For high-volume materials handling . . .

Coilmount

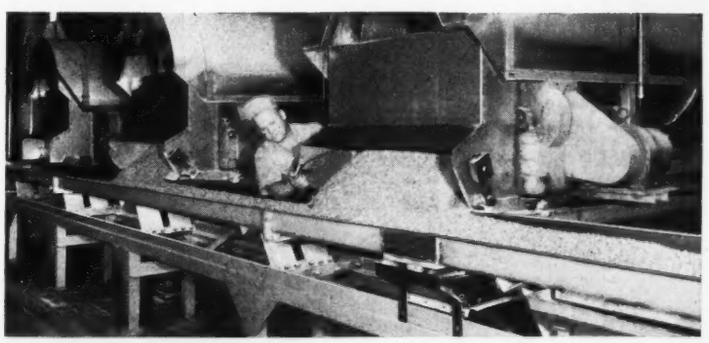
OSCILLATING CONVEYORS FROM STOCK


COMPACT
Coilmount requires an opening only slightly larger than the trough. Its compactness makes it ideal for congested, low-headroom areas.
CLEAN
Deep, one-piece metal troughs are self-cleaning, eliminate leakage and spillage. Can be made dust-tight for added cleanliness.
FLEXIBLE
Compact drive can be installed at feed end or beneath intermediate conveyor section—on left or right side to suit layout demands.
GENTLE
Coilmount's positive action smooths out surges, yet is so gentle that even the most fragile materials are conveyed with minimum degradation.

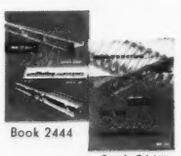
LINK-BELT's positive action and natural frequency principles prevent dampening . . even under surge loads

THE many advanced features of the new Link-Belt Coilmount oscillating conveyor make it ideal for low-cost, medium-duty applications—materials ranging from powder to lumps as wide as the conveyor trough. Combining economies of *natural frequency* with dependable *positive action,* its gentle oscillation smooths out surges for uniform, continuous feed.

Compact, pre-assembled sections simplify installation . . . reduce cost. Trough can be adapted for screening, drying, cooling or other processing operations. For facts, call your nearby Link-Belt office or authorized stock-carrying distributor. Or write for Books 2444 and 2644.



LIGHT-CAPACITY FLEXMOUNT provides uniform conveying for a wide range of materials. Compact conveyor is available from stock in 8-, 12- and 18-in. trough widths, with capacities up to 24 tph.



Book 2444 Book 2644

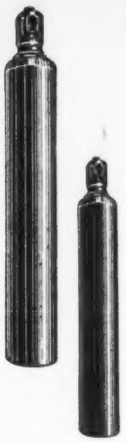
LINK-BELT

OSCILLATING CONVEYORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,457

When inquiring check 4065 opposite last page

What quality in a gas cylinder is more important than DURABILITY?



HARRISBURG Seamless Steel Cylinders for high pressure gases are famous for the many years of service they render. It was Harrisburg design and manufacturing standards that taught all industry to expect a quarter century or more of safe usefulness from gas cylinders.

The *price* of a cylinder is determined by the individual manufacturer, but the *cost* is derived from the price divided by the number of years of use. On that basis, Harrisburg Cylinders show the *lowest cost* of all cylinders made in the United States or elsewhere.

Write for prices and information.

More than a century in Harrisburg

Harrisburg Steel Co.

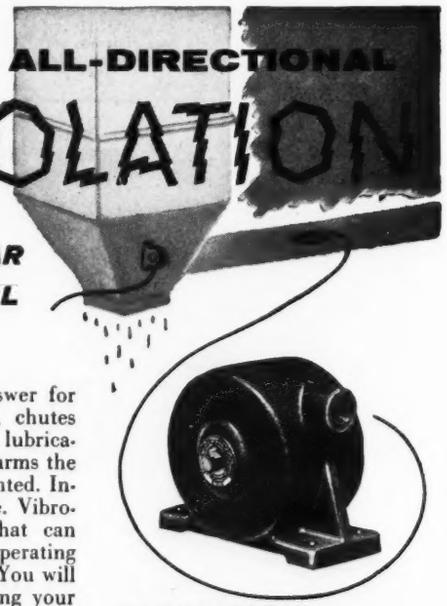
DIVISION OF HARSCO CORPORATION
HARRISBURG 24, PENNSYLVANIA

When inquiring check 4066 opposite last page

EFFECTIVE, ALL-DIRECTIONAL

VIBROLATION

MOVES GRANULAR OR WET MATERIAL NOISELESSLY



The simplest, most quiet answer for moving materials in hoppers, chutes and bins. One moving part, no lubrication, no maintenance, never harms the equipment on which it is mounted. Instantly self-starting every time. Vibrolator is the only vibrator that can guarantee this regardless of operating conditions. Write for catalog. You will also receive form for describing your problem. No obligation!

VIBROLATORS®

®Vibrolator is a registered trade name and applies only to the patented Peterson Vibrolator.

MARTIN ENGINEERING COMPANY
155 KEMP ST. NEPONSET, ILL.

When inquiring check 4067 opposite last page

Marking the first time in industry that this bridging, difficult-to-handle, heavy chemical has been continuously weighed with a plate-type scale using a belt feeder — these checkweighers, used with automatic packer, and continuous boxcar loader —

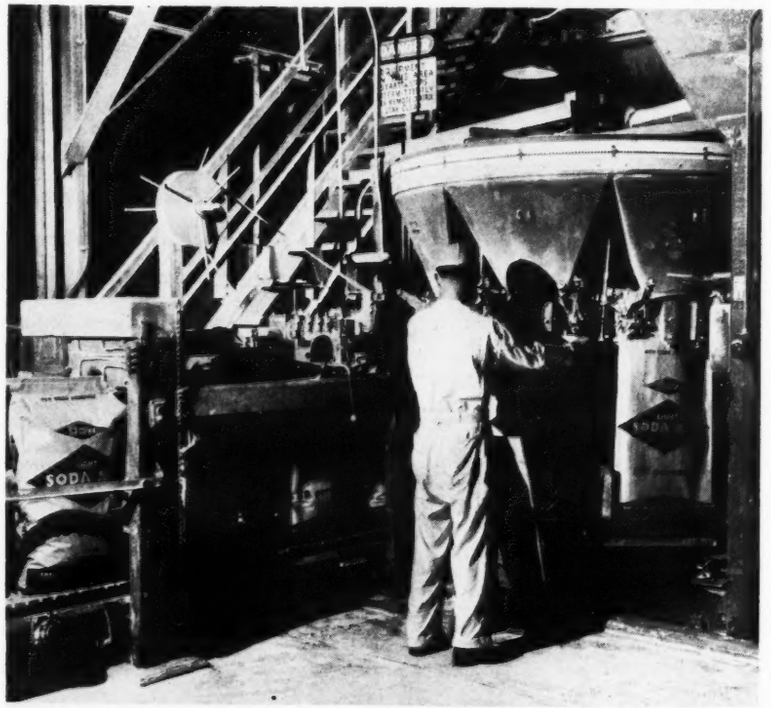
automatically bag, weigh and loa

GORDON WEYERMULLER, Associate Editor
With **W. S. CHENAULT,** Plant Supt. Soda Ash
The Dow Chemical Company, Freeport, Texas

Problem: Soda ash is a difficult material to handle in automatic equipment. The 58% light soda ash type is fine and has a tendency to bridge over and clog up machinery. When Dow built a new light soda ash plant recently at Freeport, Texas, plant was faced with problem of handling this product automatically with a minimum of manpower.

Solution: Plant, which went on stream in October 1955, installed an automatic bagging machine, which uses three plate-type scales for preweighing and a fourth for checkweighing before bags of soda ash pass to conveyor. From conveyor, bags go to automatic boxcar loader.

Packer is designed around an eight-station rotary turret, each section of the turret having independent bag spouts, bag-gripping assemblies, and bag top-forming mechanisms. Packer can handle the complete range of bag sizes from 15 to 22"



Automatic bagging machine in operation at Dow. Filled bags of soda ash at left have been weighed and are on way to conveyor

and load soda ash

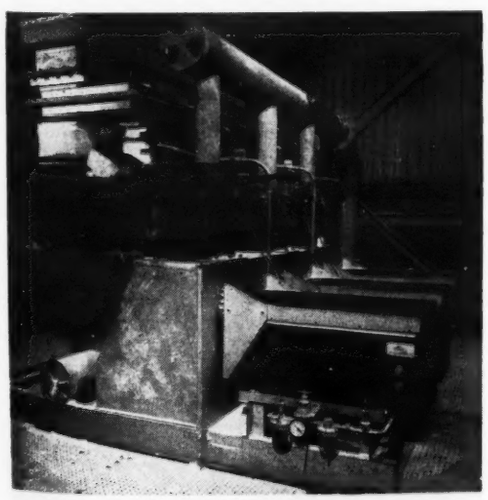
width. After automatically weighing, introducing product, and thoroughly settling the contents, machine prepares top of filled package and closes with a stitched and taped closure.

Scales used to preweigh and checkweigh the material operate by the plate frictionless leverage system. They have no knife edges to wear and change the indicated weight of material being handled. Scale leverage system retains its sensitivity and accuracy through many weighings under adverse conditions. Preweighing scale is the first one using a belt feeder that has been successfully operated in this country.

Boxcar loading machine consists of five 5′ conveyor sections. Unit travels around a 6′-radius curve, being driven in and out of car by power at a speed of 78′ per min.

Only times that loading is stopped are when conveyor is switched to opposite end of car, and near end of filling when door is boarded up.

Turn to page 140



Three plate scales at lower right automatically weigh the soda ash. Scales are installed on floor above bagging operation

New polyester film takes heat-seal!

Now you can have all the advantages of packaging in tough polyester film – *plus* heat sealing – with "SCOTCHPAK."

This remarkable polyester film takes a seal as tough as the film itself – and easily: A temperature of 275° to 375°F. and 20-60 psi is all that's required.

"SCOTCHPAK" Brand Heat-Sealable Polyester Film gives you a packaging material with a high degree of inertness and resistance to extreme temperature conditions. It also protects against solvents, chemicals and moisture – yet has high tensile strength.

Here is a versatile packaging film. Manufacturers of such varied products as cosmetics, acids, syrups, silverware, oils, greases, adhesives, asphaltics, catsup, mustard and surgical dressing will find it ideal. It can even be used as a container liner or insulation pillow.

For complete information, write for folder described at right.

TRADEMARK

"SCOTCHPAK"

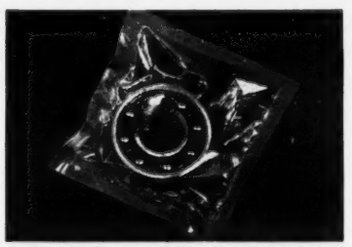
BRAND

HEAT-SEALABLE POLYESTER FILM

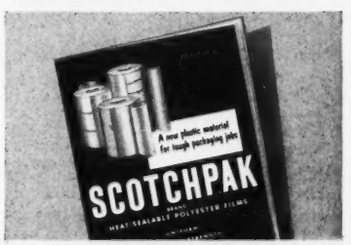
Look what you can do with it!

LIQUIDS, semi-solids, and solids can be packaged easily, handled safely, shipped without fear in heat-sealable containers of new "SCOTCHPAK" Polyester Film.

FOOD ITEMS are packaged safely in clear-as-glass "Scotchpak" Film. Contents can be frozen . . . even boiled *right in the package.* Low gas penetration rate . . . inert and non-toxic.



METAL PARTS can be packaged dry or in oil or grease to protect them against corrosion. Transparent packages are easy to handle, easy to ship and to store. Simplifies issuing of parts and units.



FREE FOLDER shows dozens of ways you can solve your most difficult packaging and shipping problems with new "Scotchpak" Polyester Film. Just write on your letterhead: Film Products Group, 3M Co., St. Paul 6, Minn., Dept. OL-67.

The term "SCOTCHPAK" is a trademark of Minnesota Mining and Manufacturing Company, St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N. Y. In Canada: P.O. Box 757, London, Ontario. © 3M Co., 1957.

PRODUCT OF 3M RESEARCH

When inquiring check 4068 opposite last page

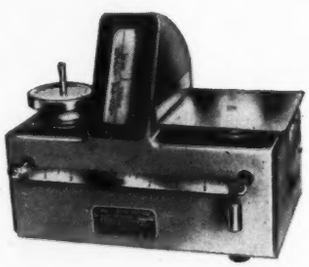
SHADOGRAPH SCALES

"Beam of Light" assures fast, accurate readings

Shadograph Scales are the newest development in precision weighing instruments. Shado-edge weight indication is projected by a beam of light onto a frosted glass dial. Friction is eliminated from the indicating mechanism and parallax readings are avoided.

In addition to being easier to read, Shadograph Scales give you unmatched accuracy and speed. Their extreme sensitivity permits weighments to fractions of a gram or ounce. Models are available in capacities from one gram to 100 pounds. Write for Bulletin 3333.

SHADOGRAPH SCALES are available in a wide range of models to meet almost every industrial need. Model 4100 above, 4200 at right.



Exact Weight SCALES

Let our weight specialists survey your weighing problem. Sales and Service from Coast to Coast.

Find us in your local 'Yellow Pages'

Exact Weight Scales

Better quality control

Better cost control

THE EXACT WEIGHT SCALE COMPANY

905 W. Fifth Avenue, Columbus 8, Ohio

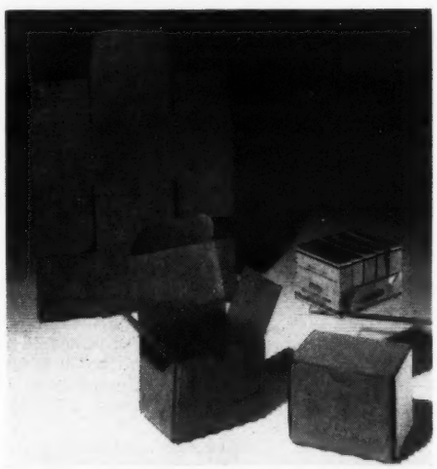
In Canada: P. O. Box 179, Station S, Toronto 18, Ont.

When inquiring check 4069 opposite last page

Permeability of polyethylene discussed in reports

Investigations to determine suitability of polyethylene for bottle-storing variety of materials are detailed in two reports. In Report 3 four samples were studied for effects of higher molecular weight, side chain branching, and irradiation by electron bombardment. Changes in permeability are tabulated and compared with results of earlier tests. In Report 3, Supplement 1, permeability factors and absorption tests are analyzed and discussed, together with data on aqueous solutions. Reports should provide data useful to packaging engineer in predicting serviceability of polyethylene bottles. Two earlier reports (1 and 2) are also available.

To obtain Report 1 (PB 111546) remit $3.25, Report 2 (PB 121194) remit $2.50, Report 3 (PB 121696) remit $2.25, Report 3, Supplement 1 (PB 121696-S) remit $1.25 direct to Office of Technical Services, United States Department of Commerce, Washington 25, D.C.



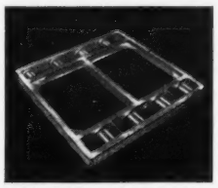
Reports shipment savings of 10-22c per package

Lightweight corrugated mailing folder (above) has saved considerable expense in shipping small lots of pharmaceuticals. This one-piece box replaced heavier chipboard unit that required a corrugated liner to cushion the product. One-piece construction makes unit quick to set up, pack, and close without stitching or gluing. Flap is secured by sealing tape for shipment. The 4⅛ x 3 x 3-inch folder has gray linen exterior. Shipping weight with product shown in photograph is approximately seven ounces.

(Mailing folder is manufactured by Hinde & Dauch, Dept. CP, Sandusky, Ohio . . . or for more information check 4070 on form opposite last page.)

MAGLINER MAGNESIUM PALLET DOLLIES are the economical, practical answer to faster pallet handling and lower loading costs. On the loading dock, in the plant or warehouse, they pay big dividends—because they keep pallet loads moving . . . stock movement fluid!

Made of magnesium, Magliner pallet dollies are *light*, easily carried by one man, and get back to the loading point fast. They're strong, tough, rugged—of welded channel construction, for dependable, long-life service. Available in fourteen standard models and in 2,000 and 4,000 lb. capacities.



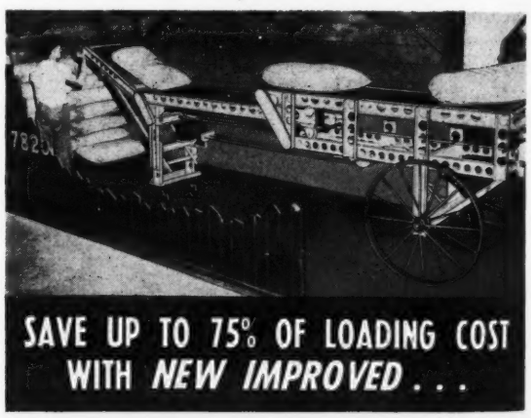
Write today for Bulletin P8-1

MAGLINE INC.

P. O. Box 306, Pinconning, Mich.

Canadian Factory: Magline of Canada, Ltd., Renfrew, Ontario

When inquiring check 4071 opposite last page



SACK LOADER

You can save up to 75% of loading cost with our new loader. Now with *one man doing the work of six* both time and money are saved through the elimination of trucking, carrying and lifting. Let us know your needs and one of our representatives will be glad to call. New brochure available on request.

Loaders are of aluminum construction for strength and light weight. Here 100 lb. sacks of feed are turned by conveyor belt as they come on to loader from delivery chute.

Ottumwa

BOX CAR LOADER COMPANY

C-200 OTTUMWA, IOWA

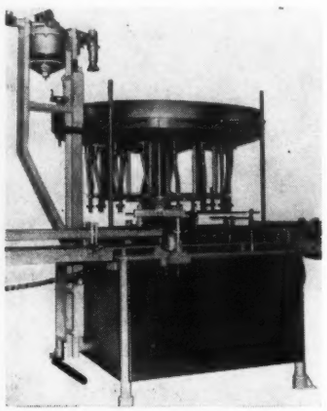
When inquiring check 4072 opposite last page

Meters desired amount of heavy oil to containers . . .

automatic filling machine handles up to 60 containers a minute

Uses: Filling containers with liquids such as olive and motor oils. Machines can be supplied for handling half-pint to gallon containers.

Features: Automatic unit operates in continuous rotary principle, with 16 spouts capable of filling up to 60 containers a minute.



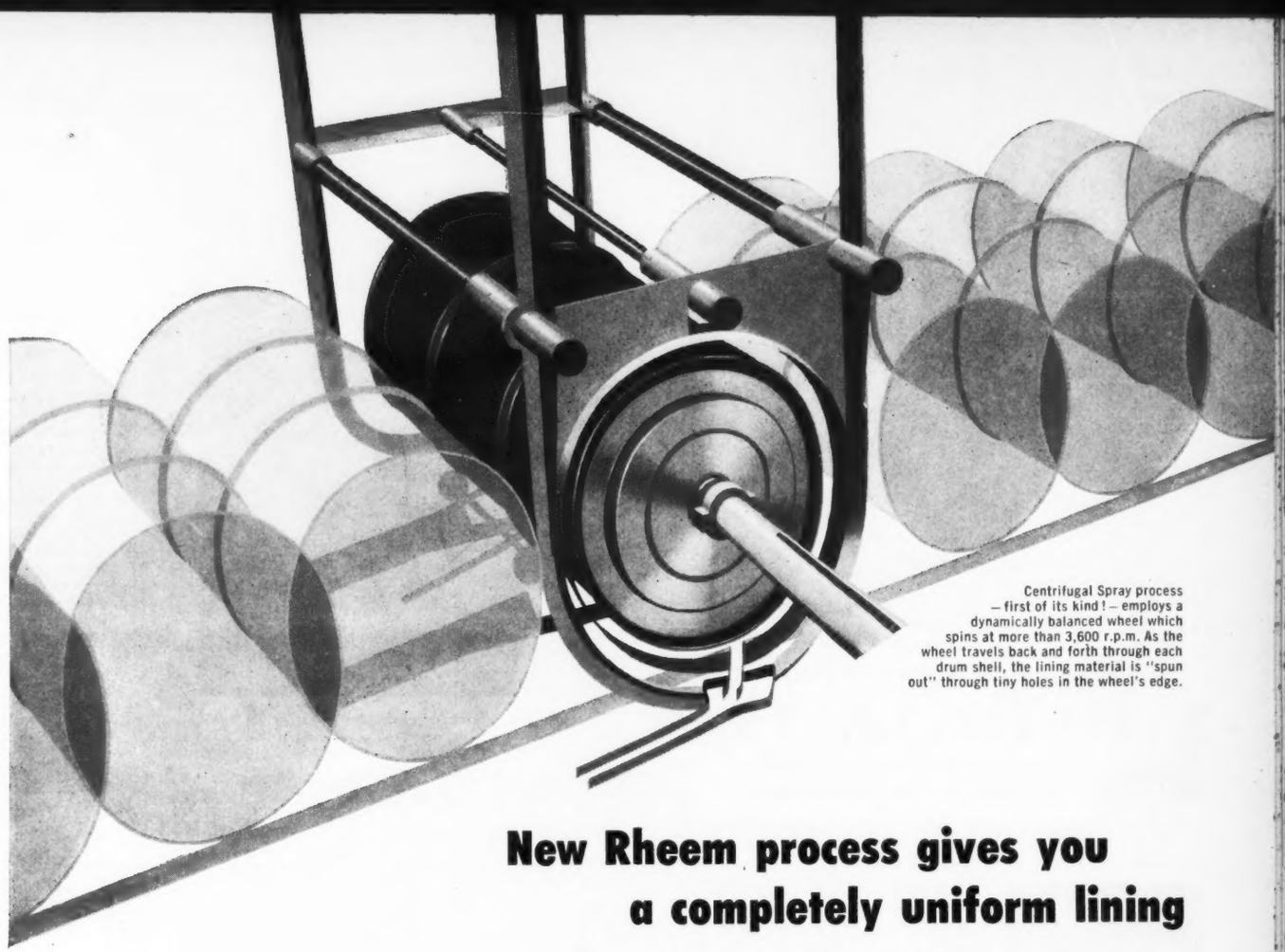
Meter on filling machine handles 25 gallons for filling quart to gallon containers

Description: Meter is connected to main supply tank mounted above filling machine. It draws and deposits exact amounts of liquid to 16 receptacles mounted into upper section of machine.

Each receptacle is connected to filling nozzle. As container moves into rotary section and comes in contact with nozzle, it automatically trips nozzle open.

If there is no container, there is no fill. All parts in contact with material are made of stainless steel.

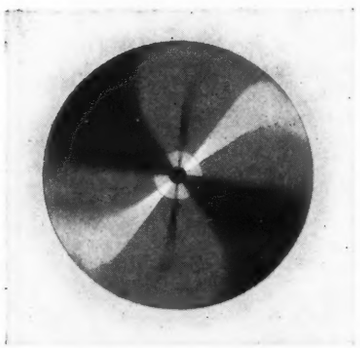
(Metered filling machine is manufactured by MRM Company, Inc., Dept. CP, 191 Berry St., Brooklyn 11, N.Y. . . . or for more information check 4073 on form opposite last page.)



Centrifugal Spray process — first of its kind! — employs a dynamically balanced wheel which spins at more than 3,600 r.p.m. As the wheel travels back and forth through each drum shell, the lining material is "spun out" through tiny holes in the wheel's edge.

New Rheem process gives you a completely uniform lining

...drum after drum after drum



New Centrifugal Sprayer spins off a continuous curtain of atomized lining material at a uniform rate.

Uniform lining thickness—controlled to within .1 of a mil
Uniform viscosity of lining materials with lower solvent content
Uniform application:
- Completely automatic · No air used in spray
- Spray travels same distance to coat all surfaces
- No air turbulence, primary air or drum rotation

Uniform curing:
- 3-stage ovens with controlled temperatures
- Controlled air flow by placing drums upright in oven

This new Rheem Centrifugal Spray process is so fully automatic, drum linings can't vary from one drum to the next, one day to the next.

It's a vast improvement over all other lining methods. For it does away with troublesome air turbulence that causes oil, dust and dirt to gum up linings applied by conventional methods.

It minimizes pinholing and blisters. It eliminates chance for human errors. It even helps the new Rheem high-temperature, vertical ovens do a still better curing job!

Why not contact our nearest office for full details.

YOU CAN RELY ON Rheem WORLD'S LARGEST MAKER OF STEEL SHIPPING CONTAINERS

Rheem Manufacturing Company

Richmond and South Gate, Calif. • Chicago • Linden, N. J. • New York • Houston • New Orleans • Sparrows Pt., Md.

When inquiring check 4074 opposite last page

Hundreds of chemical plants

BUY FROM OUR CATALOG!

"Metalsmiths" Stainless Steel and Monel Utensils

Send for your copy today!

We've shipped "Metalsmiths" corrosion-resistant utensils all over the world for more than 30 years, with utmost satisfaction. Highest quality materials and workmanship assure long wear. All items shown, plus beakers, stock pots, batch cans and shovels in stock. Buy, try, compare.

WRITE FOR LATEST CATALOG — PRICE LIST

METALSMITHS

556 White St., Orange, N. J.

Specialists in Corrosion-Resisting Equipment

When inquiring check 4075 opposite last page

TOTELINE FIBERGLASS DRYER TRAYS LAST LONGER • COST LESS

A two year test period at two American Cyanamid plants proved Toteline dryer trays outlasted enameled steel and other metal trays. Cyanamid's engineers also listed these Toteline advantages:

- Improved quality because of freedom from contamination
- Retain their shape indefinitely
- Lower costs
- Smooth, non-porous surface
- No maintenance
- No rust, chipping, flaking
- Lower replacement
- Lighter but stronger

MOLDED FIBER GLASS TRAY COMPANY LINESVILLE, PA.

World's largest producer of reinforced plastic trays

TOTELINE

For information on sizes and prices, write for bulletin #440.

When inquiring check 4076 opposite last page

Automatic Bagging

Starts on page 136

Use of automatic loader eliminates need for lift trucks to enter boxcar

Results: Automatic packaging system permits Dow to handle 16 100-lb bags of soda ash per minute with a minimum of manpower. Need for lift trucks to enter boxcars is eliminated.

Accuracy of the scale being used at Dow on soda ash is $\pm 1/2$ lb at present. This may be improved at a later date. At another plant, this same type of scale weighs prilled ammonium nitrate, an easier material to handle, with an accuracy of ± 2 oz on a 100-lb bag. It is reported that soda ash is being handled with this same type of scale at another plant with an accuracy of ± 4 oz.

(Model A Bagpacker is product of Bagpak Div., International Paper Co., Dept. CP, 220 E. 42nd St., New York 17, N.Y. . . . or for more information check 4077 on form opposite last page.)

(Thayer-plate scales are manufactured by Thayer Scale & Engineering Corp., Dept. CP, 494 E. Water St., Rockland, Mass. . . . or check 4078 opposite last page.)

(V-3 bag loader is product of Manierre Engineering & Machinery Co., Dept. CP, 759 N. Milwaukee Ave., Milwaukee 2, Wis. . . . or check 4079 opposite last page.)

Your guide . . . to more packaging & shipping ideas and equipment is the alphabetical product directory beginning on page 237

TRY DARCOVA PUMCUPS FOR

- *Higher pump efficiency*
- *Lower pump maintenance*

Cross-section of the conventional and 45° bevel type Pumcups

IT'S a fact that hundreds of reciprocating pump and cylinder users today are standardizing on Darcova Pumcups because they eliminate fluid slippage, costly down-time and maintenance!

It's easy to check these claims right in your own plant. Behind this exceptional Darcova Pumcup performance lies texture-engineering and cup design that conform precisely to pressure-temperature-fluid conditions.

Pumcups of various types are available in a complete range of sizes and texture-engineered compositions for your reciprocating pump and cylinder requirements.

Why not get *all* the facts? Send today for Pumcup Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA

TRADE MARK PUMCUPS

When inquiring check 4080 opposite last page

alphabetical index on page 237

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 237. "Quick-locator" starting on that page was a feature in **CHEMICAL PROCESSING** years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!

Liner assures high purity of resins during shipment

Uses: Polyethylene film provides anti-contaminant liner for resin shipping containers.

Features: Built-in spout, which can be connected to discharge nozzle of bag packer, permits resins to enter container untouched. Spout can easily be tied off with knot before removal from nozzle, and can be heat-sealed to provide airtight closure.

Description: Film liner is about 48 inches long, cut from extruded tube of polyethylene 78 inches

Built-in spout prevents airborne contaminants from coming into contact with resins in filling operation

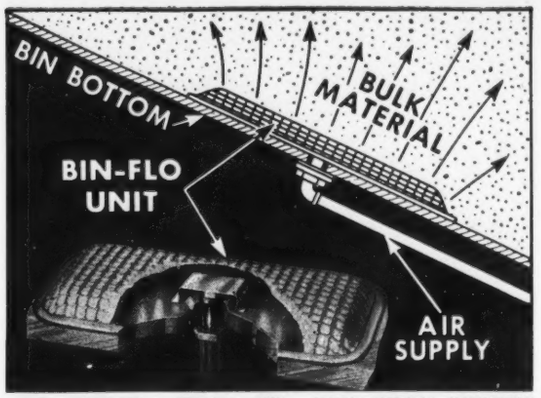
in circumference. Circle of polyethylene film is sealed to one of open ends of tube to provide round bottom. Before other end of liner is double-sealed in straight line, smaller polyethylene tube is inserted at one corner and sealed to form filling spout.

(Polyethylene drum liner is manufactured by Protective Lining Corporation, Dept. CP, Woodhull St., Brooklyn, N.Y. . . . or for more information check 4081 on form opposite last page.)

Automatic taping machine shown in operation

Subject of four-page bulletin is machine that automatically tapes and glues top and bottom of cartons in one pass. Photographs display the apparatus in operation and line drawings explain some of the operational features. Specifications are included.

Bul 11 is issued by Clybourn Machine Co., Dept. CP, 6487A N. Avondale Ave., Chicago 31, Ill. When inquiring specify 4082 on form opposite last page.



BIN-FLO USES SMALL VOLUME OF AIR AT LOW PRESSURE

KEEPS BULK MATERIALS MOVING

BIN-FLO units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

BIN-DICATOR the original diaphragm-type bin level indicator. In successful use for over 20 years. **ROTO-BIN-DICATOR** new, motor-driven paddle type; excellent on bins under pressure or vacuum, and for general application. Also explosion-proof units, U.L. listed.

THE BIN-DICATOR CO.
13946-D Kercheval • Detroit 15, Mich.
Write for detailed literature or call
VAlley 2-6952

WE SELL DIRECT • PHONE ORDERS COLLECT

When inquiring check 4083 opposite last page

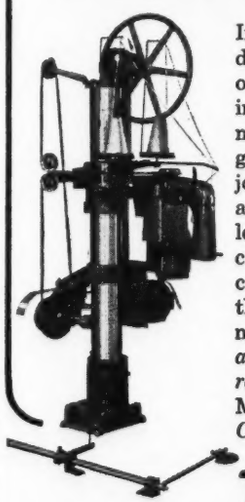
Available in knit wrist, safety cuff or gauntlet style and in full or palm coated types, Surety offers you the answer to safety, service and hand comfort with these coated fabric gloves. A vinyl base combined with a Sureseal (Hycar) rough finish Surety Griptites achieve the long life and claw-grip qualities particularly needed when working in oils, greases and slippery solvents. Write for bulletin today.

THE SURETY RUBBER CO.
CARROLLTON, OHIO
In Canada: Safety Supply Co., Toronto

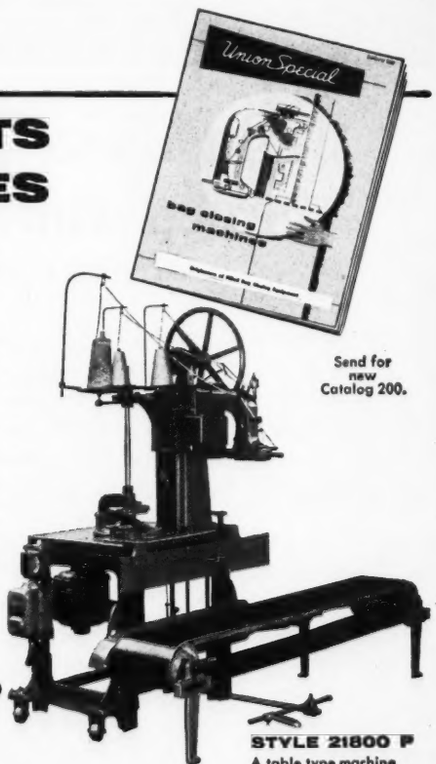
When inquiring check 4084 opposite last page

A Guide to

LOWER PACKING COSTS
BETTER BAG CLOSURES



If you're interested in bringing packing costs down, here is the way to do it. Take advantage of Union Special's wide knowledge of bag closing and its problems. By selecting your equipment from Union Special's complete line you get the correct equipment for your particular job—equipment that will do it better, faster and cheaper, giving you a stronger closure at lower cost. Whether your production schedule calls for closing just a few bags or for high continuous output, Union Special can supply the equipment to do the work efficiently, economically, dependably! *For detailed information, ask for a copy of Bulletin 200. See our nearest representative or write today.* UNION SPECIAL MACHINE COMPANY, *442 N. Franklin Street, Chicago 10, Illinois.*



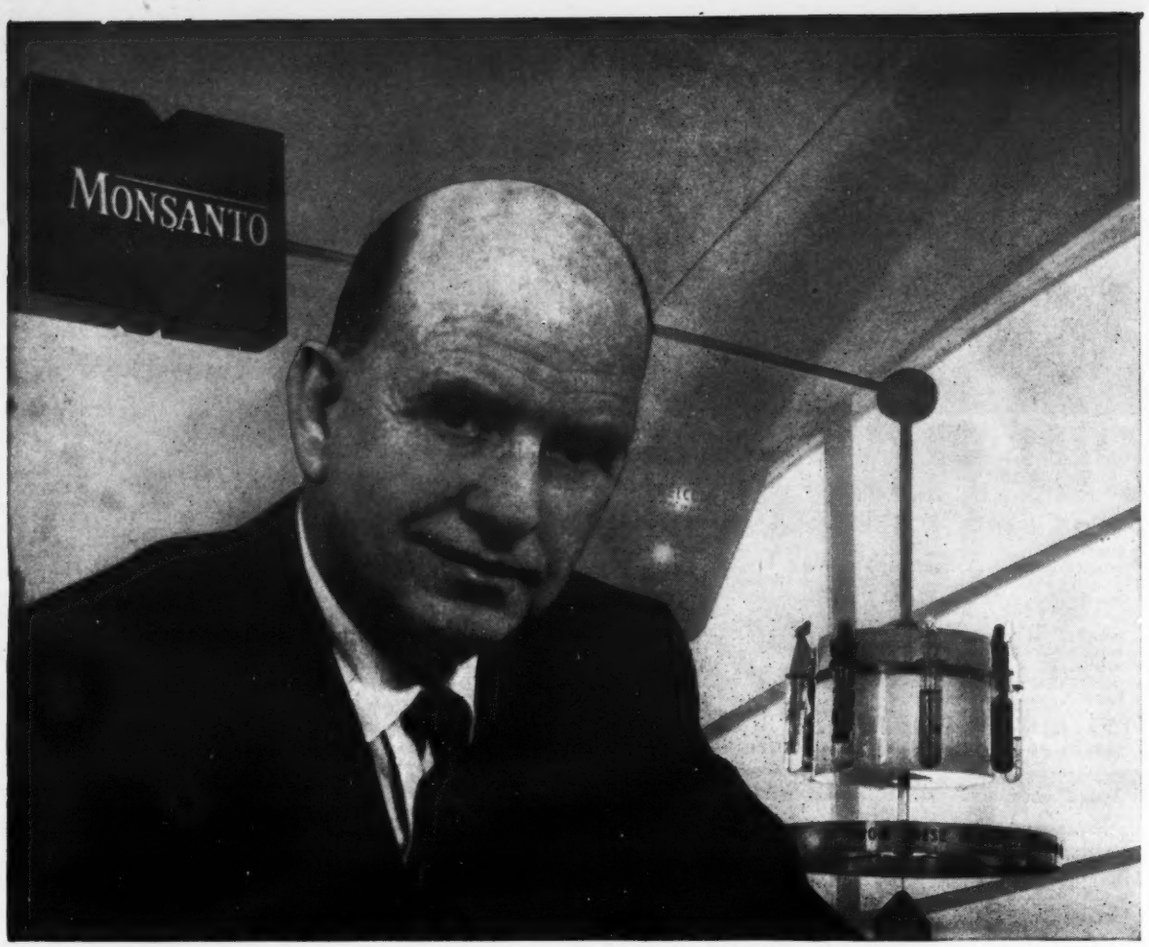
Send for new Catalog 200.

STYLE 20100 H
For use with plant conveyor systems.

Union Special®
BAG CLOSING MACHINES

STYLE 21800 P
A table type machine with conveyor.

When inquiring check 4085 opposite last page



Seen in the background is Monsanto's new St. Louis Airport display.

"Business Publications help us keep tuned to our markets"

says CHARLES ALLEN THOMAS, President, MONSANTO CHEMICAL COMPANY

"Our business is so diverse," continues Mr. Thomas, "that it would be impossible to keep abreast of shifting market needs without the help of business publications. Our top executives – and our down-the-line people, too – consider business publication reading a necessary routine."

You will find that top men like Mr. Thomas, in *every* industry use business publications as a prime source of information about their own industry and their markets. And they not only read the editorial content, but they also place equal weight on your advertising message – for there, too, they find valuable information that can help them in their business.

That's why business publication audiences are *interested* in your advertising message. And that's why these publications are direct sales routes for your product or service.

Write for list of NBP publications – see how you can pin-point your market through the use of these technical, scientific, industrial, merchandising and marketing magazines.

NBP

NATIONAL BUSINESS PUBLICATIONS, INC.

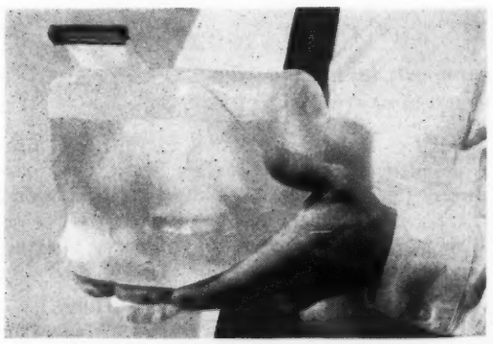
1413 K Street, N. W., Washington 5, D. C. • STerling 3-7535

Safety, lightness in weight, convenience no-deposit, non-returnable empties, and content purity are features desired in containers for laboratory reagents. Here, making a step in this direction, is lab supply house that now . . .

User pulls out polyethylene cube's pouring mouth through slotted opening in box. Another slotted opening in rear becomes safety-grip handle

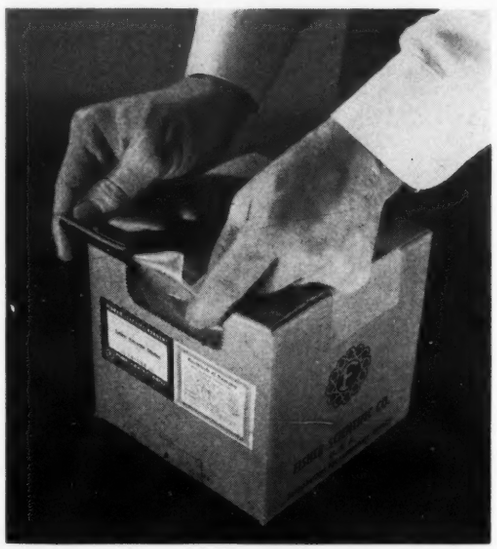
Containers for laboratory reagents are getting a new look. Not only is this bringing about safer and easier-to-handle containers, but it is also going a long way in assuring reagent quality.

Latest along this line is in the packaging of two corrosive reagents made by Fisher Chemical Mfg. Div.,



User need never remove polyethylene cube from its double corrugated-paperboard box

ships alkali solutions in boxed polyethylene cubes



For dispensing reagent, box is opened at slotted spot to expose safety spout. Spout can be easily re-sealed with a clip

of Fisher Scientific Co. Available in polyethylene "cubes" (see CHEMICAL PROCESSING, Aug 1956, p 144) are reagent-grade 50% sodium hydroxide and 45% potassium hydroxide solutions.

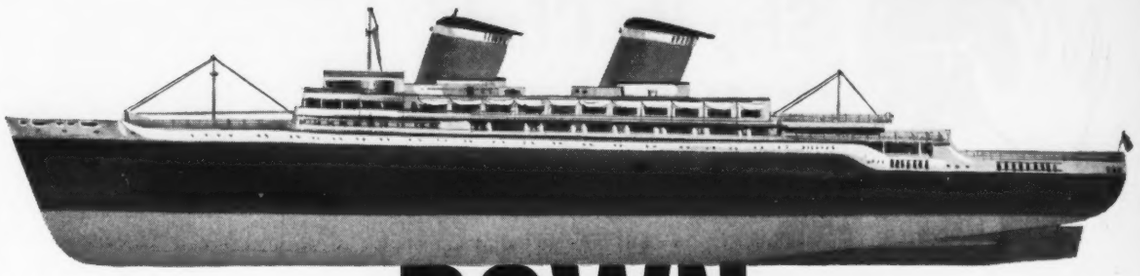
Each reagent comes in a double corrugated-paperboard box. Outer box is an ICC-approved shipping case; inner box is a container for the polyethylene cube. User need never remove the cube from its box —box has a slotted opening for cube's pouring mouth and its own pull-out safety-grip handle. Containers are easily resealed with a clip.

Benefits: no deposits required, no empties to return, and sealed-in high purity.

(Reagents are products of Fisher Chemical Mfg. Div., Fisher Scientific Co., Dept. CP, 717 Forbes St., Pittsburgh 19, Pa. . . or for more information check 4087 on form opposite last page.)

(Polyethylene "Cubitainer" is product of Hedwin Corp., Dept. CP, 1600 Roland Heights Ave., Baltimore 11, Md. . . . or for more information reader may simply check 4088 on form which is located opposite last page.)

"Another product safely shipped in Inland 'protection-eered" Containers"*



DOWN DOWN DOWN GO BARNACLE BILLS

International Paint Company of New York City is getting steamship companies out of many a tough scrape. One of the International's products, *Supertrop Antifouling #1609*, is making barnacle scraping a thing of the past. The product, brushed on to ships' hulls, prevents the attachment of underwater organisms; this helps reduce maintenance and repair costs.

Lithographed containers (to keep a family resemblance with other products in the line) was the goal of International Paint. This called for a special lining that would not only ship their hard-to-hold product but one that would also permit lithographing of the container. Inland's lining experts solved this two-fold problem with a tailor-made lining applied to an attractively lithographed pail.

Whether your products are used on land, on sea or in the air, whether you now use steel containers or not . . . if you have a packaging problem, Inland Steel Container is ready to help you. Write Bob Boecher, Dept. 331C.

**the right container, with the right lining for your product*

INLAND STEEL CONTAINER COMPANY

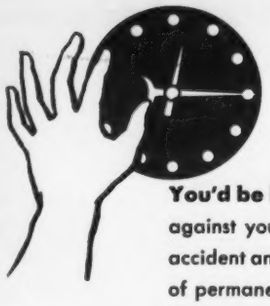
Division of Inland Steel Company • 6532 S. Menard Avenue • Chicago 38, Ill. • Plants: Chicago, Jersey City, New Orleans, Cleveland and Greenville, Ohio.

Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.

INLAND

"It's Better to Ship in Steel"

When inquiring check 4089 opposite last page



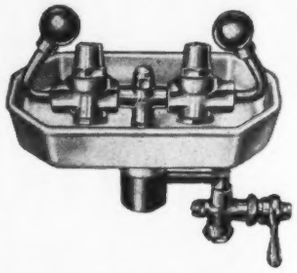
YOU CAN'T

Stop the Clock!

when an eye injury occurs!

You'd be better off if you could, for the time is working against you! THAT VALUABLE TIME elapsing between the accident and the arrival of medical aid, is too often the cause of permanent eye-injury . . . of costly insurance claims . . . of higher workman's compensation insurance rates.

No you can not stop the clock, but you can bridge this "danger period" with HAWS *Emergency Eye-Wash Fountains*! This valuable safety equipment permits workers to thoroughly wash out their eyes with clear water at safe controlled pressure. It minimizes these drastic results.



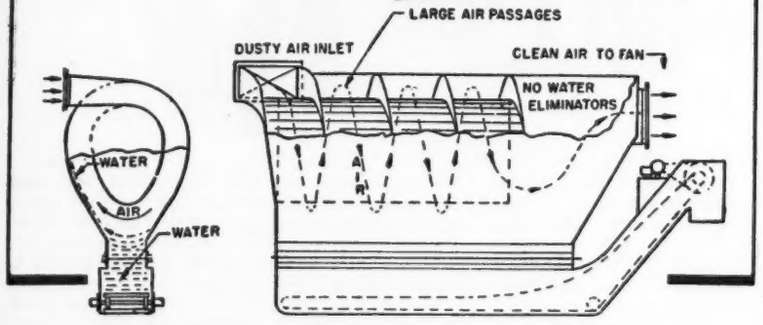
HAWS Eye-Wash Fountains and emergency drench showers are designed and manufactured in cooperation with leading Safety Engineers. Write for full details, TODAY!

HAWS DRINKING FAUCET CO.

1437 FOURTH STREET (Since 1909) BERKELEY 10, CALIFORNIA

When inquiring check 4090 opposite last page

THIS IS THE . . . . **Air Tumbler**



the master of Dust in industry ★ ★ ★

SIMPLE—DEPENDABLE
NO FIRE HAZARD
HIGH EFFICIENCY
CONSTANT CAPACITY
LOW OPERATING COST

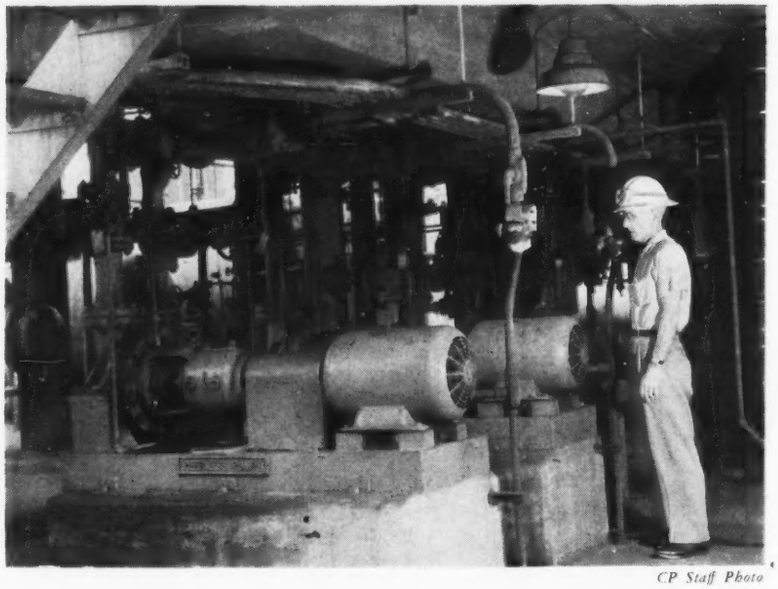
Write for Bulletin No. 551. Address:

DUST SUPPRESSION & ENGINEERING COMPANY

P. O. BOX 67, LAKE ORION, MICHIGAN

Agents in all principal U. S. cities

When inquiring check 4091 opposite last page



CP Staff Photo

Centrifugal pumps designed to accommodate rotary mechanical pressure seals —

handle hazardous carbon bisulfide

GORDON WEYERMULLER, Associate Editor
With **RAY GEORGE,** Senior Maintenance Engineer
Westvaco Chlor-Alkali Division
Food Machinery & Chemical Corporation
South Charleston, West Virginia

Problem: Conventional pumps used at Westvaco in South Charleston, W. Va., to handle carbon bisulfide — a very hazardous and penetrating material — were unsuccessful. The CS_2 penetrated the packing and leakage frequently occurred.

Solution: In 1954 a number of Type PR centrifugal pumps, which utilize double mechanical pressurized seals, were placed in service. These pumps are designed so that packing in pump can be taken out and the mechanical seal installed.

Basically the mechanical seal — consists of two anti-frictional mating rings — one rotating and the other stationary — that are held together by compression. The double seal, consisting of two single seals, is used to provide a greater degree of safety in sealing hazardous fluids. At Westvaco 10 SAE motor oil is circulated between the double seals to keep them cool, furnish lubrication, and pressurize the stuffing box to avoid leakage of CS_2. Oil is separated from the CS_2, after pumping.

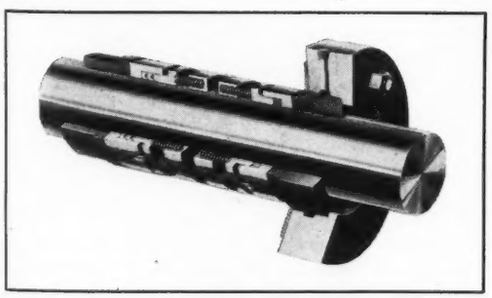
Pump is a horizontal, centrifugal type with vertically split case. It is designed with enclosed impeller. Pump is equipped with two heavy-duty, deep-groove bearings, grease-lubricated or oil-lubricated according to operating temperature. Two removable case wear rings protect case and case backhead from wear at impeller hubs.

Three sizes of pumps, which use the double mechanical seal, are in service at Westvaco. These units have capacities up to 120 gpm and discharge pressures to 80 psi. Pumps use 15-hp electric motors, direct-connected through a flexible coupling.

Results: Pumps employing the double mechanical seals have given excellent service handling the CS_2 for nearly three

Ray George, Senior Maintenance Engineer, inspects pumps which handle CS_2 satisfactorily. Ray is known as the pump expert of the Westvaco Division of Food Machinery and Chemical Corporation. He has a number of patents on pumps and has the know-how to solve the tough pumping problems that occur with the wide variety of corrosives handled at the South Charleston plant

...with safety

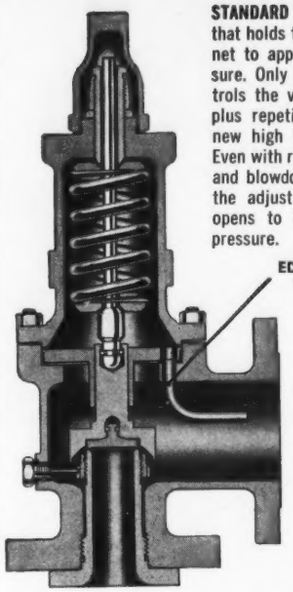


Double mechanical seal is used to provide greater safety in handling hazardous fluids

years. Operation is completely safe. Similar pumps, which use a single mechanical seal, are used for handling ammonia in the same plant.

(Centrifugal pumps are product of Peerless Pump Div., Food Machinery and Chemical Corporation, Dept. CP, 301 West Ave., Los Angeles 31, Calif. Check 4092 opposite last page.)

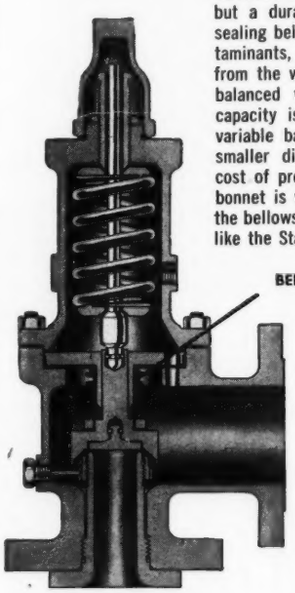
(Mechanical seals are product of Durametallic Corp., Dept. CP, Kalamazoo, Mich. . . . or check 4093 on form opposite last page.)



STANDARD VALVE. Note the eductor tube that holds the pressure in the valve bonnet to approximately atmospheric pressure. Only the force of the spring controls the valve. Far better valve action plus repetitive flow capacity assure a new high in operational dependability. Even with repeated popping, set pressure and blowdown are consistent. Whatever the adjusting ring position, the valve opens to full capacity at 10% over-pressure.

LOOK INSIDE

before you buy another safety relief valve



BELLOWS VALVE. Similar to the Standard, but a durable, two-ply stainless steel sealing bellows effectively isolates contaminants, corrosion or viscous fluids from the working parts. The bellows is balanced with the seating surface — capacity is less seriously affected by variable back pressure, so the use of smaller discharge piping reduces the cost of pressure-relieving systems. The bonnet is vented to the atmosphere. If the bellows ruptures, the valve operates like the Standard valve.

CERTIFIED AND APPROVED. Both Standard and Bellows Valves are approved under ASME Unfired Pressure Vessel Codes and are certified by the National Board of Boiler and Pressure Vessel Inspectors.

LOOK INSIDE the Consolidated Safety Relief Valve. Fewer functional parts and precision machining and alignment of parts assure long valve life and less maintenance. Economical "2 in 1" design permits the Standard valve to be converted to the Bellows type right in your own shop.

There is only one adjusting ring—it can be set easily *before* valve installation to obtain peak performance at 4-5% blowdown. *Full-rated relieving capacity* is certain at all positions of the ring because a fixed maximum secondary orifice provides full lift at 10% over-pressure. *Valve action is consistently positive* even where "superimposed" back pressure is in the relieving system.

The temperature-compensating disc eliminates seat distortion caused by temperature-induced stresses — always seats tightly even when reasonable strains of unanchored discharge piping are present. A minimum guiding area is provided to align the seating surfaces — less chance of a sticking disc holder when corrosion or contamination build up on the guiding surfaces. The seating surfaces are optically-ground flat for easier, more economical servicing.

The contours of the huddling chamber and secondary orifice take full advantage of the stream pressure and kinetic forces. No other valve has this safety feature. Note the low placement of the threaded section that holds the nozzle in the valve. It assures high resistance to discharge piping strains — no leakage resulting from strain induced into the nozzle.

BE SURE OF ABSOLUTE PROTECTION for personnel and equipment — plus low maintenance. Select Consolidated Safety Relief Valves. Full range of sizes and pressures available with standardized inlet and outlet face-to-face dimensions for easy interchangeability with the valves of some other manufacturers. *Write for Catalog 1900.*

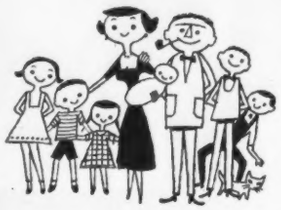
In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario.*

CONSOLIDATED SAFETY RELIEF VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** TULSA, OKLAHOMA

MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, *Stratford, Conn.* 'HANCOCK' VALVES, *Watertown, Mass.* 'CONSOLIDATED' SAFETY RELIEF VALVES, *Tulsa, Okla.* AIRCRAFT CONTROL PRODUCTS, *Danbury, Conn. and Inglewood, Calif.* "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, *Muskegon, Mich.*

When inquiring check 4094 opposite last page



alphabetical index on page 237

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 237. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!

Lightweight, durable goggles provide protection, comfort

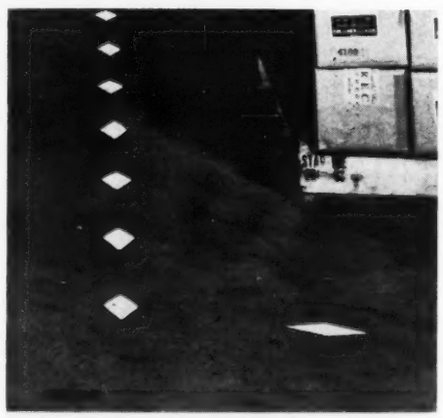
Uses: For providing comfortable protection to workers exposed to dust and liquid splash.

Features: Although plastic construction makes them extremely lightweight and flexible, goggles are unusually durable.

Description: Flexible plastic goggles are molded from soft vinyl material. Perfectly contoured, they fit snugly all around. Wide window lenses are curved to allow full vision. Small perforations, angled away from the eyes, give adequate ventilation. Available in clear or green plastic, goggles can be worn over most personal glasses.

Flexible, lightweight goggles are unusually durable

(CESCO 565 goggles are product of Chicago Eye Shield Co., Dept. CP, 2302 Warren Blvd., Chicago 12, Ill. . . . or for more information check 4095 on convenient Reader Service slip which is located opposite last page.)



Vinyl marks aisles

Made of vinyl plastic, non-shifting aisle markers are resilient, abrasion-resistant, and unaffected by oil, grease, salts, water, or temperature changes. Available in red, yellow, or white, 1/8" thick markers (edges are bevelled) come in two sizes.

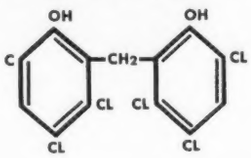
(Klear-Vu Aisle markers are manufactured by Lester Brossard Co., Dept. CP, 540 N. Michigan Ave., Chicago 11, Ill. . . . or for more information check 4096 on form opposite last page.)

King of bacteriostats . . .

G-11®

(HEXACHLOROPHENE U.S.P.)

(U.S. Pat. 2,250,480)



Sindar's G-11 (Hexachlorophene U.S.P.) now imparts bacteriostatic and deodorant properties to MORE THAN 2,000 PRODUCTS used in homes, hospitals and industries! Over 95% of America's hospitals use G-11 soaps or detergents for the surgical scrub . . . more consumer dollars are spent for G-11 soaps than for any other brand. In cosmetics and pharmaceuticals, too, G-11 is the chosen antiseptic.

Wherever a bisphenol is indicated, see Sindar! Write today for technical information and bulletins describing what G-11 Hexachlorophene *is* . . . and what it can do for *your* product.

SINDAR® *Corporation*

Industrial Aromatics and Chemicals

330 West 42nd Street

New York 36, N. Y.

When inquiring check 4097 opposite last page

AJAX

LO-VEYORS

FOR MULTI-PURPOSE HANDLING AND PROCESSING OF BULK MATERIALS

This popular type of Ajax open pan Lo-Veyor is used extensively where there are no contamination problems.

AJAX Lo-Veyors are made in lengths from 3 feet up. They are available in open pan or booted cover types to safeguard critical processes or formulas against contamination. Conveyor pans can be arranged for simultaneous screening, washing, drying, cooling and other operations. Stringy, elongated, abrasive, fine or course mesh materials never hang up while being conveyed in Ajax Vibrating Lo-Veyors. The positive upward and forward tossing action keeps materials flowing freely and evenly.

Tubular type Ajax Lo-Veyors provide sealed, gas tight operation in closed systems under vacuum or pressure. Diaphragm seals can be used where tube passes through walls of processing plants.

Ajax Vibrating Lo-Veyors are self-contained, require little head room for drive and pan, are easily and quickly installed on or below floor levels or suspended from walls or ceilings. Made in a wide range of sizes and lengths, they are being used from beginning to end in progressive processing.

Write for Bulletin 39

AJAX FLEXIBLE COUPLING CO. INC.

WESTFIELD, N. Y.

When inquiring check 4098 opposite last page

Sounds alarm when preset radioactivity level is exceeded

Uses: Detecting changes in radioactivity level of an area. When preset level is exceeded, monitor warns personnel in the area.

Features: Warning system uses visual and audible alarms. Instrument is available with either a

Instrument measures radioactivity and warns when preset level is exceeded

beta-gamma sensitive GM probe, or with a gamma-sensitive scintillation probe. Sensitivity is 50 to 50,000 counts per minute.

Description: Monitor incorporates recently developed 3-cycle logarithmic count-rate meter. It operates on 110v, weighs 15 pounds, and measures 8″ high, 9″ deep, and 18″ wide. Probe has six-foot reach when fully extended.

Equipment includes built-in precalibrated radioactive test sample, and a 3600 cycle-per-minute test signal.

("Nucliguard" monitor is manufactured by Nuclear Measurements Corp., Dept. CP, 2460 N. Arlington Ave., Indianapolis 18, Ind. . . . or for more information check 4099 opposite last page.)

Movie series tell foreman how to be good safety supervisor

Illustrated bulletin of four pages is aimed at developing safety-conscious supervisors. Series includes four films available as 16mm sound motion pictures (black and white) or as 35mm sound slidefilms. Running time for each film is approximately 13 minutes.

Bulletin on "Supervisor Development Films" is issued by National Safety Council, Dept. CP, 425 N. Michigan Ave., Chicago 11, Ill. When inquiring specify 4100 opposite last page.

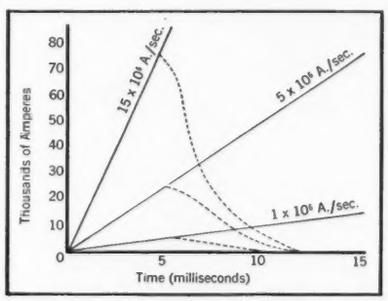
I-T-E

D-C CIRCUIT BREAKERS

Type FB-20 single pole circuit breaker; 2000 amperes continuous, 1000 volts d-c.

NEW "FB" CURRENT LIMITING CIRCUIT BREAKER

Now...complete current limiting protection against fault currents of 1000 to 150,000 amperes



Peak let-through current for FB circuit breaker with 1000 ampere trip.

Small in size, these FB d-c circuit breakers with fast current limiting action provide a tremendous protective capacity. In the event of a fault, powerful springs open the contacts before the current has a chance to rise to its maximum potential.

Even in circuits where the rate of rise might approach 15,000,000 amperes per second, let-through current will not exceed 80,000 amperes. In most applications, it will never exceed 30,000 amperes—and total interrupting time is only 12 milliseconds. This quick action reduces the magnitude and duration of fault currents—thus eliminating mechanical failures and heat damage.

FB circuit breakers are available in either single or double pole models and with continuous current ratings of 1200, 2000, 3000 and 5000 amperes and up to 1000 volts d-c. They are available with either stationary or drawout mounting. Write for Bulletin 3004-A. I-T-E Circuit Breaker Company, Switchgear Division, 19th & Hamilton Sts., Philadelphia 30, Pa.

I-T-E

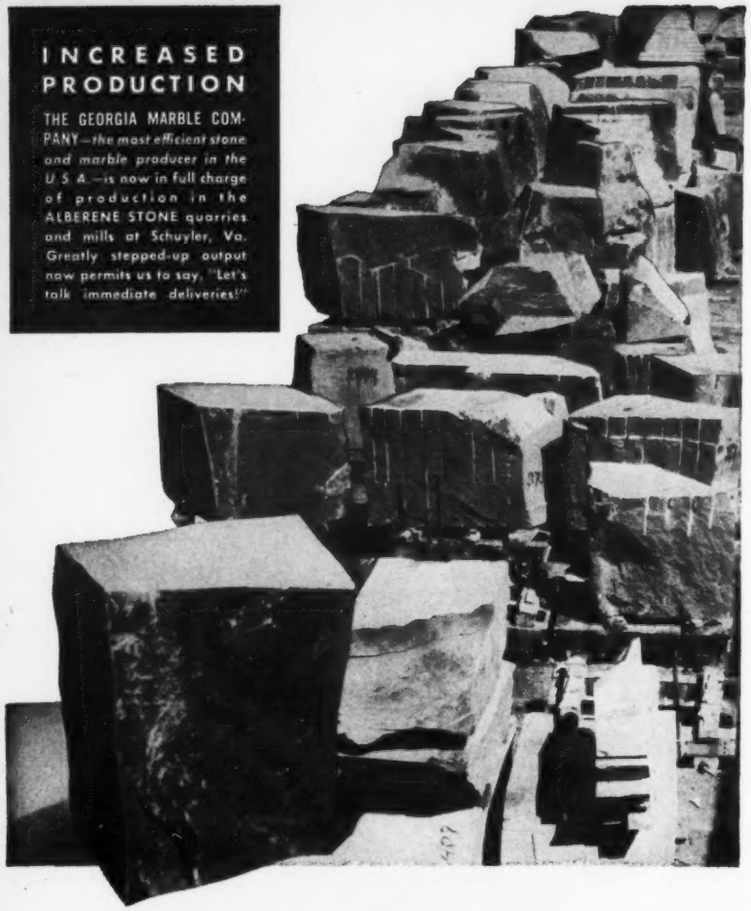
I-T-E CIRCUIT BREAKER COMPANY • Switchgear Division

IN CANADA: EASTERN POWER DEVICES LTD.

When inquiring check 4101 opposite last page

INCREASED PRODUCTION

THE GEORGIA MARBLE COMPANY—*the most efficient stone and marble producer in the U. S. A.*—is now in full charge of production in the ALBERENE STONE quarries and mills at Schuyler, Va. Greatly stepped-up output now permits us to say, "Let's talk immediate deliveries!"



Immediate Deliveries!

Alberene Stone can be shipped normally in 60 days—or even sooner to meet very special circumstances. We can schedule our deliveries to meet all reasonable requirements of contractors and laboratory equipment manufacturers.

Further, the supply of Alberene Stone is inexhaustible. New veins are constantly being located in company owned quarries in Albermarle and Nelson Counties, Va.

Alberene Stone *is the only natural silicate stone with the surface that goes all the way thru.* It can be cut, drilled, tongue-and-grooved, refinished and reused almost indefinitely — *while providing the best obtainable chemical resistance!*

For information and technical assistance, address: Alberene Stone Corporation, 419 Fourth Avenue, New York 16, N. Y.

ALBERENE STONE

provides LOW ABSORBENCY protection

When inquiring check 4102 opposite last page

SAFETY

Anti-slip wax won't discolor — scuff and water resistant

Uses: For industrial uses on all surfaces.

Features: Material has anti-slip properties. It can be used on light-colored or even white floors without fear of discoloration.

Description: Reformulated water emulsion floor wax is formulated with highly refined grade of pure, light-colored Carnauba wax. Hard, clear, glossy plastic emulsion, developed by company, has been added to give wax durability. Manufacturer reports product will provide high initial gloss without buffing, and is scuff and water resistant. It can be easily removed when desired, and may be damp mopped and buffed repeatedly as means of economical maintenance.

(Westwax is product of West Disinfecting Co., Dept. CP, 41-16 West St., Long Island City 1, N.Y. . . . or for more information check 4103 on form opposite last page.)

Lights long passageways, exits, and critical control points when power fails . . .

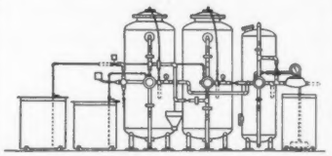
emergency lamp has device to prevent loss of water from unit's batteries

Uses: For providing emergency lighting when current fails or other lights go out.

Features: Units have floodlight type, sealed-beam lampheads with strong center beam to light long passageways or to pinpoint exits and critical controls.

Floodlight type, sealed-beam lamps produce strong-center beam for emergency lighting of passageways

ILLCO-WAY ionXchange

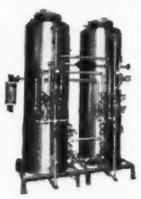


GET H_2O ONLY

In those processes where chemically-pure water is desired, the most economical way to obtain it is often by de-ionization. Current ionXchange practice provides an effluent which is chemically the equivalent of that obtained by multiple distillation.

ELIMINATE ALL DISSOLVED SOLIDS

Starting with water containing various dissolved solids such as calcium sulfate, magnesium carbonate, silica, etc., one form or another of ionXchange can be employed to eliminate ALL of these solids in the resultant purified water. ***We have been designing and building practical equipment to accomplish such results ever since the enabling resins first became available.*** **Tell us your needs, and let us see what we can do . . .**



ILLINOIS WATER TREATMENT CO.

ionXchange

ILLCO-WAY

903 CEDAR ST. ROCKFORD, ILLINOIS

NEW YORK OFFICE: 141 E. 44TH ST., NEW YORK 17, N. Y.
CANADIAN DIST. PUMPS & SOFTENERS, LTD. LONDON, ONT.

When inquiring check 4104 opposite last page

You should know!

SERV-RITE®
Thermocouple Wire
with
BONDED STAPLE INSULATION

Many inherent advantages of this newly developed bonded staple yarn insulation make it adaptable to a wide range of applications. It is suitable for continuous use at temperatures up to 1600° F. and in adverse atmospheric conditions. It is flexible, tough, does not powder, and can be color coded.

Gordon's research and product development laboratory has worked out the application of bonded staple yarn to thermocouple wire and, now, offers to industry any SERV-RITE thermocouple wire or thermocouple extension wire with this new insulation. The commonly used wires are available for delivery from stock.

Gordon service engineers shall be glad to advise on the use of this new insulation in your particular applications. Write for full particulars.

Ask for Bulletin No. 1200-1

This bulletin gives the advantages of bonded staple yarn insulation and ordering information on several commonly used wires.

7008

CLAUD S. GORDON CO.
Manufacturers • Engineers • Distributors

603 West 30th Street, Chicago 16, Illinois
2031 Hamilton Ave., Cleveland 14, Ohio

When inquiring check 4105 opposite last page

Description: Emergency lights plug into standard outlets and light up when flow of current is halted. Light comes from two battery-operated lamps. Units have device that is reported to almost totally prevent loss of water from batteries by trapping and re-converting hydrogen and oxygen given off in charging. At the same time, corrosion around terminals is prevented, and there are guards against explosion hazards from the free hydrogen gas. Timing mechanism prevents overcharging the battery when on "high charge".

"Watchmaster" series of emergency lights are manufactured by the Automatalite Division of Carpenter Manufacturing Company, Dept. CP, Bradley Street, Somerville 45, Massachusetts . . . or for more information about manufacturer's product reader may simply check 4106 opposite last page.)

Neoprene gloves don't deteriorate from age

Allergen-free neoprene gloves will not irritate sensitive skin

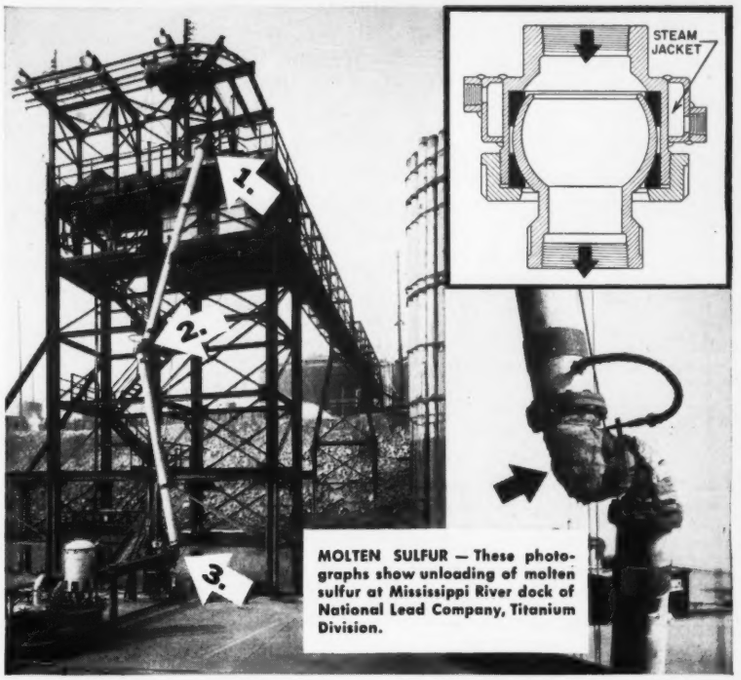
Uses: For providing hand protection in industrial services requiring contact with oils, greases, petroleum solvents, caustics, and toxic solutions.

Features: Gloves will not deteriorate from age or exposure to sunlight. They are completely free of allergens and will not irritate sensitive skin.

Description: Neoprene gloves have curved-finger styling for maximum comfort and flexibility. They are offered in light, medium, medium-heavy, and heavy weights, and are available in 11, 14, and 18" lengths. Sizes range from 7 to 12 in most styles.

(Wil-Gard neoprene gloves are product of Industrial Div., Wilson Rubber Co., Div. of Becton, Dickinson, and Company, Dept. CP, 1200 Garfield Ave., S.W., Canton 6, Ohio . . . or for more information reader may simply check 4107 on the convenient Reader Service slip which is located opposite last page.)

Barco Steam Jacketed Flexible Ball Joints



MOLTEN SULFUR — These photographs show unloading of molten sulfur at Mississippi River dock of National Lead Company, Titanium Division.

UNLOADING LINE
Heated for Free Flow!

HOT steam is the secret of handling sulfur as a liquid at barge loading and unloading docks. Barco's new Steam Jacketed Flexible Ball Joints are an integral part of the splendidly engineered installation shown above. A traveling crane raises and lowers pipe made flexible with Barco Joints. This arrangement accommodates river stages varying up to 40 feet. This permanent, maintenance-free, labor-saving installation eliminates the problems of rapid deterioration and frequent maintenance encountered with hose.

For recommendations on how to use Barco Flexible Ball Joints in loading lines handling oil, chemicals, gasoline, alcohol and other fluids, ask for a Barco engineering field representative—located in principal cities.

FEATURES

COMPLETE LINE — Barco Steam Jacketed Flexible Ball Joints are now offered in 2", 3", 4" and 6" sizes.

TO MEET YOUR NEEDS — Straight and angle; screwed and flanged styles. Steel casing.

FLEXIBILITY — The ball provides more than 30° total angular movement in any direction.

VERSATILE—For handling sulfur, asphalt, and other heavy materials. Heat speeds flow; cuts loading time.

ENGINEERING RECOMMENDATION—Ask for a copy of new catalog 2158 on "Barco Flexible Ball Joints for Piping."

BARCO
Manufacturing Co.

5376 Hough Street • Barrington, Illinois
In Canada: The Holden Co., Ltd., Montreal

When inquiring check 4108 opposite last page

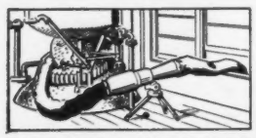
Ventilate CONFINED Places with Vano Design "C" Ventilator-Exhauster

WELDING FUMES are here removed by this Vano Ventilator-Exhauster.

Ideal for withdrawing welding fumes from confined places or directly from the welding rod. Provides greater safety, greater comfort for workers . . . leads to greater work efficiency. Can be furnished with 8" suction inlet to which 8" non-collapsible suction tubing may be attached . . . or provided with multiple inlet nozzles for 5", 4" and 3" suction hose.

Other types are also available for supplying fresh air to men working in confined places, such as tanks, manholes, drums, boilers and shipholds.

Coppus Engineering Corporation
386 Park Avenue
Worcester 2, Mass.



FUMES FROM A REACTOR KETTLE are here withdrawn by tripod-mounted Vano Ventilator-Exhauster. Note non-collapsible suction tubing and discharge tubing.

ANOTHER COPPUS "BLUE RIBBON" PRODUCT

When inquiring check 4109 opposite last page

Tough . . . Flexible
"Pylox" Coated Jersey

Stanflex® **GLOVES**

Tear, snag, abrasion resistant "Pylox" coated jersey outwears leather and cloth . . . stays flexible in coldest weather. Non-slip satin finish. Seamfree work surface. Knit wrist, 10" band top, 12" and 14½" gauntlet styles available. Select the right gloves for your job from the complete PIONEER line.

No. 5062

MAIL THIS COUPON TODAY

The PIONEER Rubber Co.
241 Tiffin Road,
Willard, Ohio, U. S. A.

Pioneers in Hand Protection

Please send me:
- ☐ The name of my nearest PIONEER Glove Distributor.
- ☐ 1956-57 PIONEER Industrial Glove Catalog.
- ☐ Hand Protection Clinic glove recommendation for job described in enclosed letter.

FIRM_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

SIGNED_____

When inquiring check 4110 opposite last page

Excessive chlorine in air indicated by detector . . .

device warns of chlorine concentrations exceeding 3 ppm

Uses: For warning of chlorine concentrations exceeding 3 ppm in air.

Features: Detector can be used to actuate external audible alarm. Unit can be located at any convenient point with respect to area being checked for chlorine contamination, provided sum of lengths of inlet and discharge

Rotation of test paper reel can be observed through glass window (top right) in detection chamber

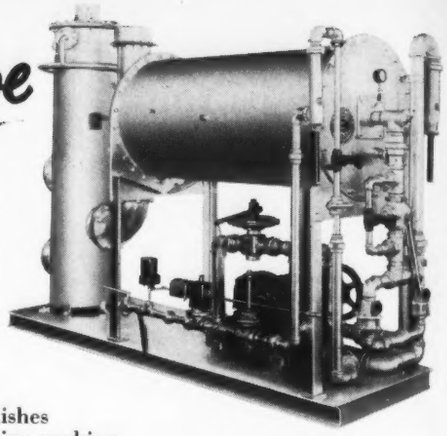
sampling lines does not exceed 200 feet.

All parts which come in contact with air being monitored are made of materials resistant to corrosion by chlorine gas. All connections are gas tight so chlorine laden air cannot enter control mechanism.

Description: Continuous sample of air enters detection chamber through air-flow regulating valve that permits 0.3 to 0.4 cfm of air to flow through chamber. Flow manometer, visible from front of detector, indicates sample flow. Strip of ¾" wide test paper is mounted on reel of about 3" diameter which rotates continuously at one half revolution per minute.

If chlorine is present in sample, test paper will darken, reducing amount of reflected light. Light-

Produces Protective **ATMOSPHERE GAS** *for . . .*



- ✓ Bubbling batches of synthetic resins, varnishes and bodying oils during cooking.
- ✓ Preventing explosions due to dust or finely divided powders.
- ✓ Purging storerooms of dangerous combustibles.
- ✓ Metal treating, brazing, sintering without oxidization or scaling.

Converts fuel gases to lean or rich exothermic gas. Complete unit includes combustion equipment and safety controls, processed gas cooler, water separator and refrigerant dryer (if desired). Available in output capacities of 250 to 10,000 cfh.

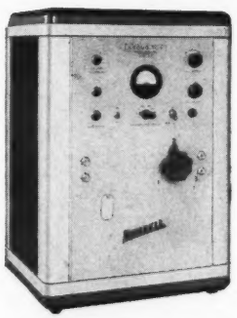
ROCKWELL SINCE 1888 BUILT

W. S. ROCKWELL COMPANY
FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY
2207 ELIOT STREET • FAIRFIELD, CONN.
Sales Representatives in Principal Cities

When inquiring check 4111 opposite last page

BURRELL *"For Scientists Everywhere"*

New! **UNIVERSAL MODEL K-3**



KROMO-TOG®
For Gas and Vapor-Phase CHROMATOGRAPHY

- *Routine Analysis in Any Laboratory!*
- *Process Control in Manufacturing!*

Bench or panel-mount anywhere . . . uses metal columns of various lengths . . . analyzes gases or liquids, even liquids boiling up to 300°C.

Fractions collected easily, individual temperature control of cell and columns, finest detector cell available and other exclusive Burrell features. You'll get unexpected accuracy and thoroughness far faster than ever before.

COMPACT SIZE
Only 24" x 16" x 13"

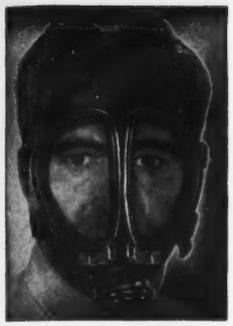
BUILD-UP DESIGN
Accessories can be added to basic unit

NEW LOW PRICE

Cat. No. 340-30 — $795. for Basic Unit • *Ask for Bulletin 831*
F. O. B. PITTSBURGH, PA. ® Trademark

BURRELL CORPORATION
Scientific Apparatus and Laboratory Supplies
2223 Fifth Avenue, Pittsburgh 19, Pennsylvania

When inquiring check 4112 opposite last page



YOU'RE SAFER WITH

ACME

. . . the Gas Mask that gives you
MAXIMUM USABLE VISION

Tests prove that ACME Gas Masks lead the field in giving you clear, undistorted vision — up, down, and to either side. Along with maximum usable vision, you get greater comfort, less fogging, minimum breathing resistance and acceptable conversation transmission — all at down-to-earth prices. Write for Bulletin No. 541 on gas masks.

FREE PROTECTION GUIDE lists 433 gas hazards and how to overcome them. Write for Bulletin No. 542.

ACME PROTECTION EQUIPMENT CO.
1219 Kalamazoo Street, South Haven, Michigan

When inquiring check 4113 opposite last page

HOW TO BATCH OR BLEND LIQUIDS

Accurately, Safely, Automatically

Use

ROCKWELL LIQUID METERS

with Automatic Quantity Control Valves

This simple Rockwell system brings *automation* to the liquid process industry. To operate, you pre-set the quantity on the meter register—then open the valve. When quantity is measured, the valve closes automatically *and without shock*. This meter system eliminates human errors in compounding formulas. It's quicker and less costly than batch tanks or weigh scales . . . safer, since a closed metered piping system avoids the hazards of fumes and contamination. Available in stainless steel, bronze, steel or all-iron construction. Get full facts by writing Rockwell Manufacturing Company, Pittsburgh 8, Pa.

When inquiring check 4114 opposite last page

sensitive electronic unit is adjusted so darkening of paper equivalent to a concentration of 3 ppm of chlorine in air will actuate alarm. Test paper, easily replaced without use of tools, should be changed daily. Unit is made for either wall or panel mounting.

(Detector is manufactured under patent license from Solvay Process Division, Allied Chemical and Dye Corp.)

(Solvay chlorine detector is manufactured by Wallace & Tiernan Inc., Dept. CP, 25 Main St., Belleville 9, N. J. . . . or check 4115 opposite last page.)

Tells employes how they can protect their hands

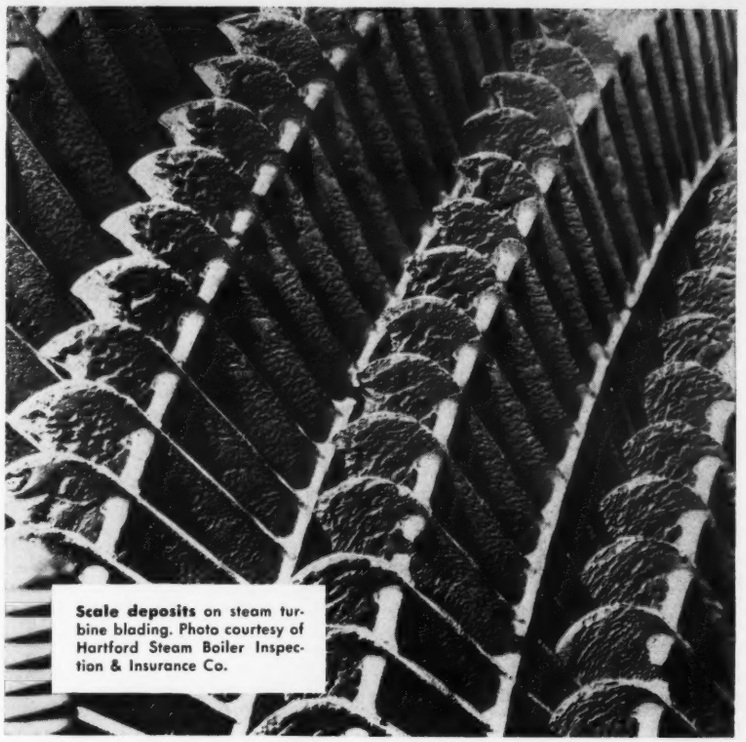
Cartoon-illustrated, eight-page booklet gives the worker various tips on how to protect his hands on the job. Points stressed are wearing of gloves (list shows kind of glove to wear for protection when handling various chemicals and objects), guarding against equipment, and proper method of cleaning hands.

Sample copy of "Your Ten Best Tools" and instructions for ordering in quantity may be obtained from National Safety Council, Dept. CP, 425 N. Michigan Ave., Chicago 11, Ill. When inquiring specify 4116 opposite last page.

Discusses operation, uses of CO analyzer

Manufacturer's analyzer, which detects accumulation of dangerous gas concentrations, is discussed in four-page bulletin. Operation and applications are explained. Photographs and drawings show construction of equipment.

Bul 0702-1 is issued by Mine Safety Appliances Co., Dept. CP, 201 N. Braddock Ave., Pittsburgh 8, Pa. When inquiring specify 4117 opp. last page.

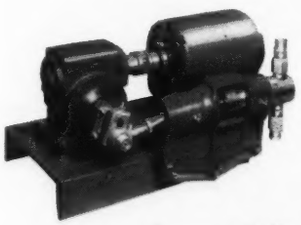


Scale deposits on steam turbine blading. Photo courtesy of Hartford Steam Boiler Inspection & Insurance Co.

No Build-Up! No Blow-Up!

. . . WHEN MODEL 1106 PROPORTIONEER FEEDS BOILER WATER CHEMICALS

Prevent scale build-up (caused by boiler carry-over) on turbine blades with proper raw water or internal steam boiler treatment. Model 1106 Proportioneer feeds all chemicals (alkaline, neutral, or acid) accurately (guaranteed within ±1%) over 15 to 1 range. Capacities range from 0.11 to 35.6 GPH . . . for discharge pressures up to 1100 psig.



PAY LESS, GET MORE!

Design features of this proportioning pump include interchangeable measuring cylinders, super-accurate Vane-Guide check valves, and percentage calibrated stroke-length scale.

Request Bulletin 1106-2 for complete data. Write to PROPORTIONEERS, INC., 387 Harris Avenue, Providence 1, Rhode Island.

PROPORTIONEERS, INC.
DIVISION OF
B-I-F INDUSTRIES
PROVIDENCE, RHODE ISLAND
METERS FEEDERS CONTROLS

When inquiring check 4118 opposite last page

You can't beat

Model RA

FOR MEDIUM TO HEAVY MIXING

• TOPS in performance!

Stainless steel throughout. Fully sanitary—meets the strictest Health Dept. requirements. Equipped with GROEN-exclusive demountable shaft couplings which cannot disengage in operation, yet permit removal of agitator assembly in a few seconds for easy cleaning. • Large revolving scraper blades maintain movement of contents away from heated walls into baffle. Small blades below prevent settling. Efficiency is positive . . . results dependable. Bulletin RAK-2 gives full, illustrated details. Write for your copy today.

BULLETIN RAK-2

Gives all the facts and figures. Tells how to get faster, better medium to heavy mixing. Write for this Bulletin now.

GROEN
STAINLESS STEEL STEAM JACKETED
MIXER KETTLE

AGITATOR PARTS QUICKLY REMOVABLE FOR EASY CLEANING

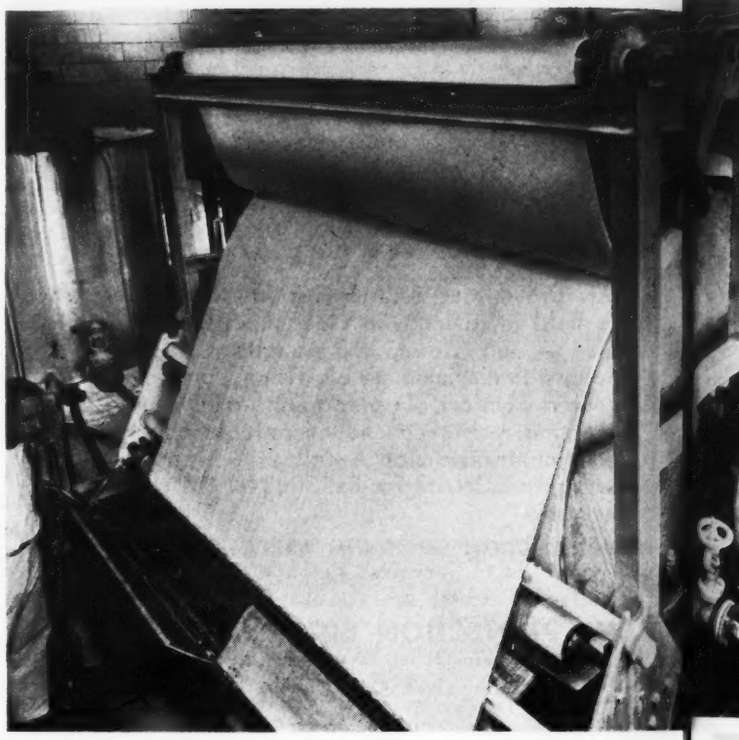
IF YOU need EXTRA-HEAVY mixing ask us about TWIN-SHAFT Model TA.

ILLUSTRATION SHOWS ALL AGITATOR PARTS DISASSEMBLED

GROEN MFG. CO. DEPT. CP 67
4535 W. Armitage Ave., Chicago 39 • 30 Church St., New York 7

GROEN *Half a Century of Fine Kettles*

When inquiring check 4119 opposite last page



Filtering thin, sticky aluminum hydroxide was a bottleneck in production of Gelusil at Warner-Chilcott Laboratories. Although some experts said it couldn't be done, company discontinued former filtration method and replaced it with rotary vacuum unit, which uses less space and . . .

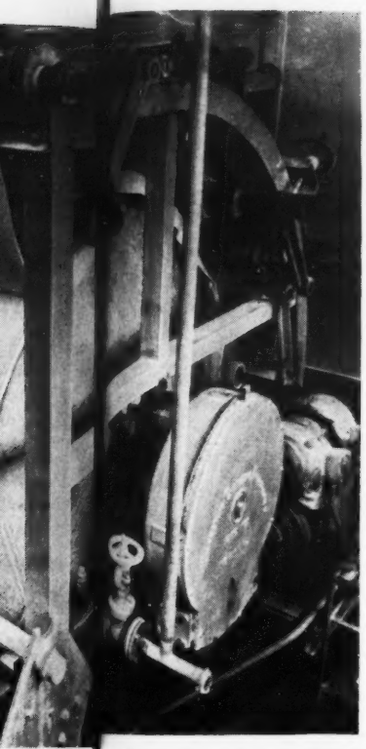
filters twice as much aluminum hydroxide

R. O. BUCHHOLTZ, Manufacturing Superintendent
E. E. CRAIG, Manufacturing Supervisor
Warner-Chilcott Division,
Warner-Lambert Pharmaceutical Co.
Morris Plains, New Jersey
With **CP Staff**

Problem: A faster and more economical method of filtering aluminum hydoxide was among foremost considerations of Warner-Chilcott when manufacturing facilities were to be consolidated in a new plant at Morris Plains, N.J.

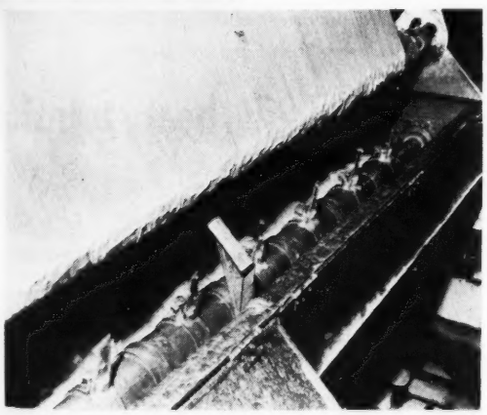
Only a single batch could be processed daily at each of two installations using conventional filtration equipment. Pumping in and washing solution took 5½ to 8 hr, while another hour was consumed in opening the filter, digging out sticky aluminum hydroxide gel, and dumping it in equipment to convert it to a water suspension. Overtime was invariably needed by two operators to complete each daily cycle. At a second processing installation a similar situation existed requiring two shifts of two men each to produce desired quantity of material.

Aluminum hydroxide, basic ingredient in Gelusil antacid, is produced as a suspension in water by neutralization of aluminum sulfate with aqua ammonia. This slurry must be filtered and washed to remove any impurities present in reactants and by-products formed during the reaction. It is then



◀ Rotary vacuum filter at Warner-Chilcott Laboratories processes twice as much aluminum hydroxide as two conventional units previously did

Sticky aluminum hydrate cake is lifted from filter drum by linen-string discharge mechanism ▼



adjusted to proper concentration. Flavors and other constituents are added, and it is passed through a colloid mill and into storage.

Solution: As a result of leaf tests in filter maker's laboratory and pilot runs made in Warner-Chilcott's plant, a rotary vacuum filter was fabricated and installed in the new plant in February 1954, a few weeks before production was scheduled to begin.

Filter has metallic contact parts made of 304 stainless, and 6′6″-diameter drum with an 8′ face, giving

Turn to page 160

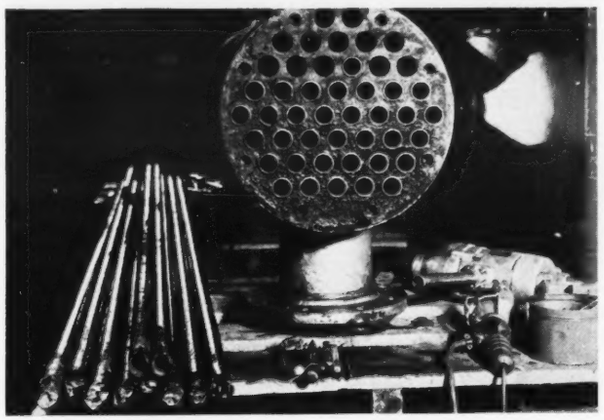
BRIDGEPORT BRASS

COPPER ALLOY BULLETIN

CONDENSER AND HEAT EXCHANGER TUBE EDITION

How to Equip Ammonia Condensers For Long, Low-Cost Service

New England Dairy Does It with Bridgeport Duplex Tubes



New Bridgeport Duplex Tubes being installed in ammonia condenser. On left are original steel tubes which had average service life of 7 years and had to be cleaned at least 3 times a year.

Bridgeport Duplex Tubes being rolled in to make tight, leakproof seats. Most Duplex Tubing can be expanded and rolled in as readily as single-metal tubes.

When dual corrosion problems exist, Bridgeport Duplex Tubes help cut maintenance costs and improve operating efficiency. The reason is that each alloy used in a Duplex Tube can be selected to withstand the specific corrosion problem on each side of the tube.

Operation on Ammonia Condensers

The experience of H. P. Hood & Sons, Boston, Mass., one of New England's largest dairies, is a case in point. Recently, this company installed Duplex Tubes in gas coolers and condensers in some of their plants, including their Boston ice-cream plant.

The units, cooled with city, well, and spray tower water, formerly used steel tubes, which required cleaning as often as three or four times a year. Head pressures under peak loads ran to 200 psi and over. The steel tubes averaged 7 years of effective life.

Duplex Tubes Boost Performance

The steel tubes were replaced by 1¼″ OD x .089″ Duplex Tubes — .042″ copper inside and .047″ steel outside. Life expectancy of the Duplex installation is 20 years or more, and the chief engineer anticipates no cleaning during this period. Head pressures under peak load in most cases are down to 165 psi, with proportionate water savings.

The Duplex Tubes have cut maintenance costs by eliminating cleaning operations and by giving three times longer service. Water costs have been reduced by about 10% and head pressures by 17%.

Past Experience A Factor

One reason for the Hood Company's decision to use Duplex Tubes has been its long and favorable experience with them. Direct experience goes back to 1949, indirect experience to 1938, when it was discovered that equipment in a plant acquired by Hood in New Haven had been equipped with Bridgeport Duplex Tubes in that year. The 1949 installation was in a plant in Portland, Maine, in a shell and tube ammonia gas cooler. These tubes have not been cleaned since put in. They have been checked at least once a year and show no signs of corrosion or erosion at the tube ends.

In the New Haven plant, Duplex Tubes, in operation since 1938, showed on inspection that they still had many years of service left. As far as could be determined, these tubes had never been cleaned.

Duplex Has Many Applications

Duplex Tubes are the efficient, economical answer to many problems in ammonia refrigeration systems as well as in ammonia and synthetic rubber production, process industries, chemical plants, coke by-products plants and oil refining. The savings they bring in longer service life and less frequent retubing and shutdowns quickly repay their original cost.

Help In Selecting Duplex

Our long experience in the field can save you time in selecting the right Duplex combination—in metals and gauge—for your specific conditions. Call your nearest Bridgeport office today.

Send for these Duplex and Condenser Tube Bulletins

Technical Bulletin #1954 is a 16-page brochure giving properties, applications, and other important Duplex Tube information.

The Bridgeport Condenser Tube Handbook is a comprehensive 162-page manual covering all phases of heat-exchanger and condenser-tube design, operation and application.

Copies sent on request. (2425)

BRIDGEPORT BRASS

Bridgeport Brass Company, Bridgeport 2, Connecticut, Offices in Principal Cities
In Canada: Noranda Copper and Brass Limited, Montreal

When inquiring check 4120 opposite last page

Sparkler Model MCR filter showing generous cake space between plates for longer cycles.

Plenty Cake Space between plates

SPARKLER MODEL MCR FILTER

The total throughput (or cycle) of any filtering operation is largely dependent upon the amount of filter cake space available. Therefore, Sparkler has provided amply for this, to allow continuous operation far longer than is possible in filters where plates are spaced close together simply to increase plate area in a given size tank. Cake space is as important as plate area for effective filter capacity.

This large cake capacity is of particular importance for economical operation in heavy duty filtering.

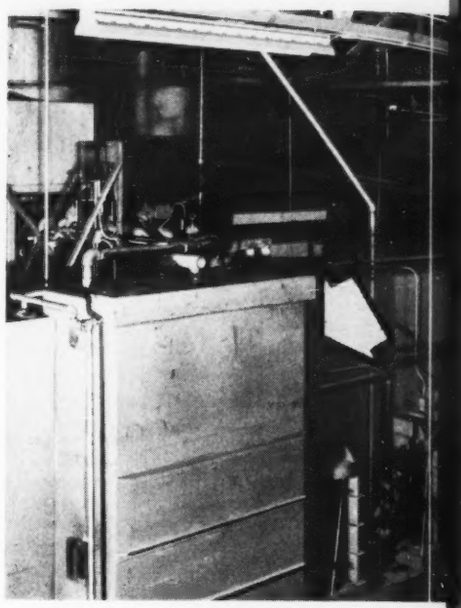
Exclusive Filtration Engineers for over 25 years.

Sparkler Model MCR retractable tank, heavy duty filter, with Sparkler-Passalaqua Speed-Lock cover; opens in seconds. ASME approved. 1000 sq. ft. of plate area.

SPARKLER
MANUFACTURING CO.
MUNDELEIN, ILL.

REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD.

When inquiring check 4121 opposite last page



Cascade-type heater is designed for heating corrosive and sludge-forming solutions. Flame emitted from burner does not come in contact with solution being heated and unit features . . .

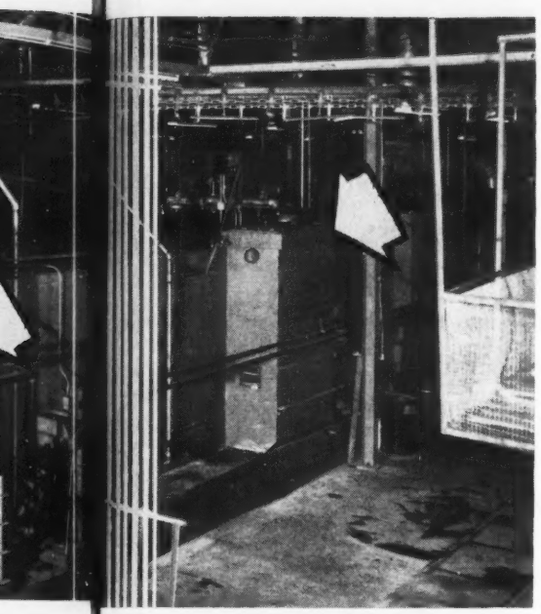
high heat transfer,

Uses: Heating corrosive and sludge-forming solutions.

Features: Heaters have high heat transfer efficiency, flue gases leave the system at 200-300°F., which gives low operating costs. Flame emitted is extremely short, so that nothing but heated air comes into contact with solution being heated. This prevents emission of noxious gases, avoids excessive absorption of combustion gases by the solution, and decreases fuel consumption.

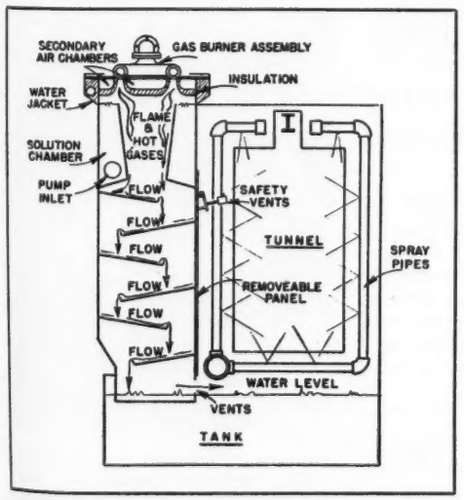
Description: Equipment consists of a series of strip burners at the top of the unit, number of which is determined by the heat transfer requirements. Solution being heated runs over a series of pans, sloped in opposite directions, one above the other, in a cascade chamber (see drawing). Depth of solution on pans is about 1½". Liquid runs from one pan to another over a saw-toothed edge. Gases do not have to pass through liquid. Entire unit is under slight pressure, causing heated

Turn to page 156



Heaters (arrows) are mounted along side of solution tanks at Utility Appliance Company

low operating cost

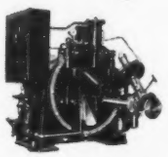


Section through Cascade heater and spray tunnel shows flow of solution and path of heated air and gases.

SHARPLES *Continuous* CENTRIFUGES FIT INTO MODERN PRODUCTION

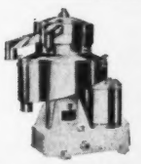
Seven types of Sharples continuous centrifuges—each designed and industry-proved to do a better job in a particular set of circumstances.

SUPER-D-CANTER
Continuous centrifuge for separation of large amounts of solids from slurries, and for wet classification of solids.



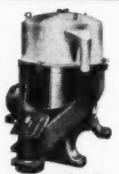
SUPER-D-HYDRATOR
Completely automatic crystal dehydrator with external control of feed, rinse, and drying cycles.

DG-2 AUTOJECTOR
A clarifier or separator which automatically discharges liquids and comparatively dry solids.



DH-3 NOZLJECTOR
Heavy duty continuous solids discharge clarifier, separator and concentrator for high solids content slurries.

. . . and all seven of these Sharples types of centrifuges, including numerous additional variations, stand ready to serve you in the Sharples Process Testing Laboratories—these are full-sized machines capable of running your product under plant conditions.



D-2 CENTRIFUGE
High capacity centrifuge effects clarification of liquids and separation of two immiscible liquids. Continuous liquids discharge.

SUPER CENTRIFUGE
Provides highest centrifugal force of any commercial centrifuge (13,200 x G); clarifies liquids and separates two immiscible liquids.

SUPER CLASSIFIER
A continuous fine dry powder classifier combining high capacity, sharp separations, and high product recovery.

Modern processing needs the *facts* about the savings in continuous centrifuging—Sharples has the full line from which to make an unbiased recommendation—backed up by performance.

Come first to Sharples . . . for the right centrifuge to do the job right.

SHARPLES

THE SHARPLES CORPORATION
2300 WESTMORELAND STREET • PHILADELPHIA 40, PENNSYLVANIA
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • NEW ORLEANS
SEATTLE • LOS ANGELES • SAN FRANCISCO • HOUSTON • ST. LOUIS
Associated Companies and Representatives Throughout the World

When inquiring check 4122 opposite last page

Starts on page 154

gases to pass at high velocity through spaces between pans. Burners are so designed that secondary air, as well as primary air and gas, is introduced under pressure, giving a highly efficient flame. Heaters can be made of acid-resistant steels and may also be plastic lined. Unit rated at 2½ million Btu is 80" wide. A 5 million Btu heater is only 128" wide. Other sizes can be built according to requirements. Neither flame nor hot gases impinge upon any metal part within the unit and, therefore, maintenance is minimized.

Heaters have proven their worth at Utility Appliance Corporation, Los Angeles, California, where they have operated for over nine months without experiencing any maintenance costs. Three of the units are installed on each of the company's two finishing lines. Heaters are used to heat phosphate coating solutions to 140°F, hot rinse solutions to 145°F, and chromic rinses to 140°F. Heaters have two strip burners and are mounted directly on sides of solution tanks. Hot solutions are sprayed on parts as they move on monorail conveyor system through spray tunnels.

(Cascade heaters are product of Ransohoff, Inc., Dept. CP, North Fifth Street at Ford Boulevard, Hamilton, Ohio . . . or for more information check 4124 on form opposite last page.)

alphabetical index

on page 237

. . . for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 237. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!

MODEL "M" BAR-NUN

ROTARY SIFTER

FEATURES

- Stainless Steel product zone.
- Big Capacity—up to 40 sq. ft. of screen area in floor space 3½ ft. square.
- Complete Rotary Motion—rapid, accurate separations.
- Totally Enclosed—dust-tight.
- All-Mechanical, heavy-duty drive and base.

In some plants, installation of a modern Bar-Nun has multiplied screening capacity in the same floor space. And, every inch of screen surface is active and productive. The Bar-Nun's single plane, uniform rotary motion rapidly exposes the material to a maximum number of screen openings.

The sifter box (stainless steel panels mounted on cast aluminum frames) totally encloses the screens, for dust-tight operation. Screens are easily removed for cleaning. Rugged all-mechanical construction and accurate counterbalancing assure smooth, trouble-free performance — and durability.

When you want top screening efficiency . . . economy . . . durability, you want the Model "M" Bar-Nun Rotary Sifter. Available with from 2 to 78 square feet of screen surface, for single or multiple separations. Write for Bulletin 503.

Recommendations and Engineering Service without Obligation

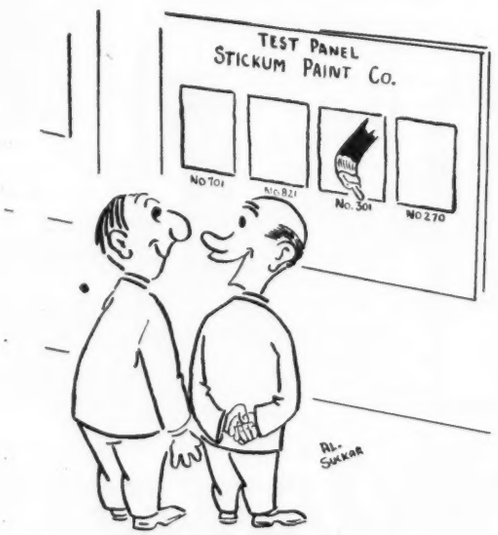
FEEDING · MIXING · SIFTING · WEIGHING · PACKING EQUIPMENT FOR THE PROCESS INDUSTRIES

B. F. GUMP CO.

Engineers & Manufacturers Since 1872

1344 S. Cicero Avenue • Chicago 50, Illinois

When inquiring check 4123 opposite last page



"301 is our latest in quick-drying paint."

Thanks to A. E. Suckar, Esso Standard Oil Company, Linden, New Jersey.

We're looking for IRON TROUBLE

If you have it. . . . . get rid of it with

FERROFILTER®

ELECTROMAGNETIC SEPARATORS

Count on Frantz FERROFILTERS — Gravity, Underfeed or Pipeline types — to remove even the finest contaminating iron particles from liquids and slurries. Result: a cleaner product of improved quality that helps increase customer acceptance for your goods.

Send for BULLETIN 46-E

S. G. FRANTZ CO., Inc.

Brunswick Pike & Kline Ave.,
P. O. Box 1138 Trenton 6, N.J.

GRAVITY FERROFILTER in continuous use for 13 years cleaning body slip and glaze in a plant making some of the country's finest chinaware.

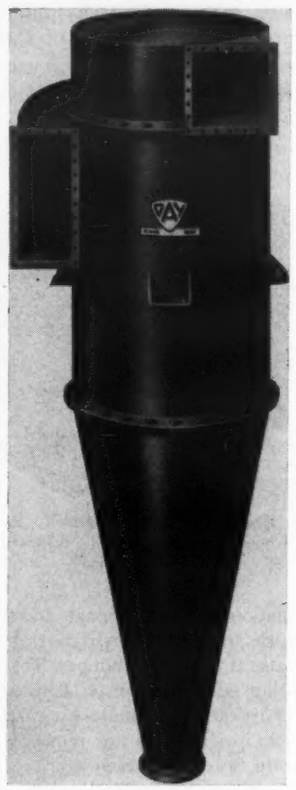
When inquiring check 4126 opposite last page

Dust removed quickly, efficiently with centrifugal collector . . .

designed to give air only minimum turbulence

Uses: Removing fibrous, granular, abrasive, and fine or coarse dusts from air streams at normal or high temperatures.

Features: Collector is designed for maximum efficiency — path of dust-laden air encountering only minimum of turbulence, due to scroll inlet and airfoil design inlet vane. Steep, smooth cone assures uniform and prompt delivery of dust to the dust outlet. Unit's low-resistance design results in less fan power being required than conventional collectors of similar capacity.



Collector's steep, smooth cone assures uniform, prompt delivery of dust to the dust outlet

Description: Centrifugal dust collector is made of heavy-gage welded black iron, having considerably longer service life than lighter-gage type units. Stainless steel construction is also available if required. Collectors are available in wide range of sizes capable of handling from 150 cfm of air and up. Units are used on pressure or vacuum.

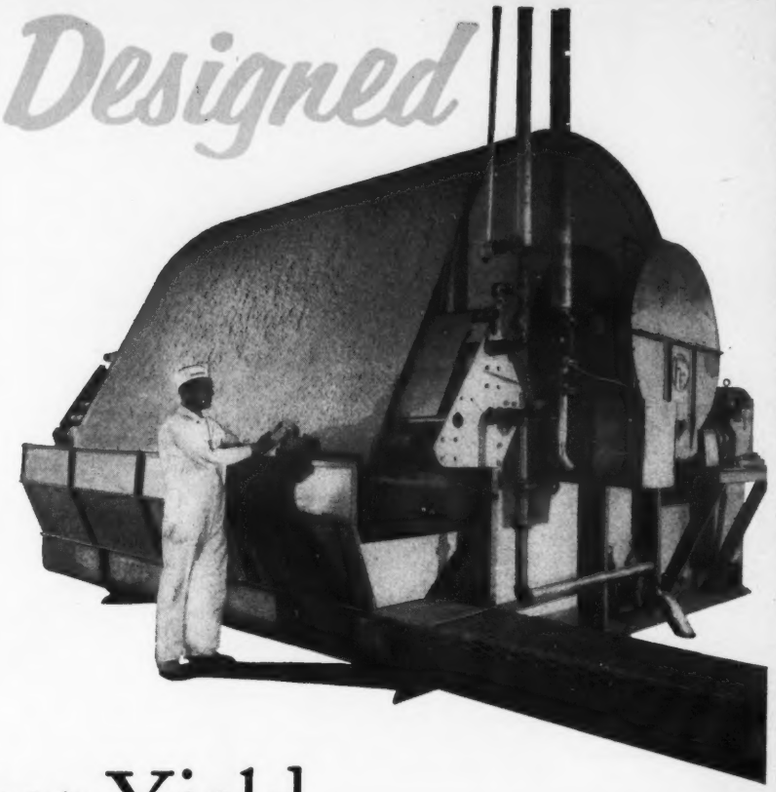
("HV" centrifugal collectors are product of The Day Sales Company, Dept. CP, 810 Third Avenue, N. E., Minneapolis 13, Minnesota . . . or for more information check 4127 on form opp. last page.)

End uses, properties of filter felt

Properties, characteristics and end uses of manufacturer's filter felt are described in eight-page data sheet. Physical properties and performance characteristics are shown in tabular form.

Data Sheet 18 is issued by American Felt Co., Dept. CP, Glenville, Conn. When inquiring specify 4128 on form opposite last page.

Custom Designed



For a Bigger Yield

Higher yield in your case may mean cleaner, dryer cake . . . or better recovery of solubles . . . or just plain fast, trouble-free operation on a job that's got to be done. If you can get a few points better efficiency at no extra cost, why not?

FEinc custom-designed continuous vacuum filters have been doing just this for 37 years: For instance:

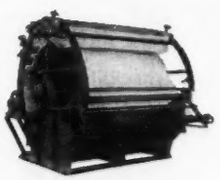
- Replaced six settling tanks in recovering plastic grinding waste . . . paid for itself in 3 months
- Reduced moisture in iron pigment from 68 to 59%
- Cut recycling of difficult gelatinous sulphate cake from nine to five cycles
- Eliminated plugging, gave three hours more running time daily on sticky clay
- Reduced solubles in metallic stearate from 0.5 to 0.05%
- Recovered ⅔ of chromates left by competitive filter

All types of continuous rotary vacuum filters . . . string, horizontal, scraper, precoat, etc. . . . are custom designed and manufactured by FEinc . . . quality built because quality pays you. Ask for bulletins . . . or for recommendations . . . no obligation, of course.

47

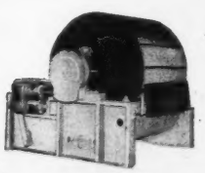
For a Bigger Yield **FEinc**

FILTRATION ENGINEERS, INC.
155 Oraton Street, Newark 4, N. J.



STRING

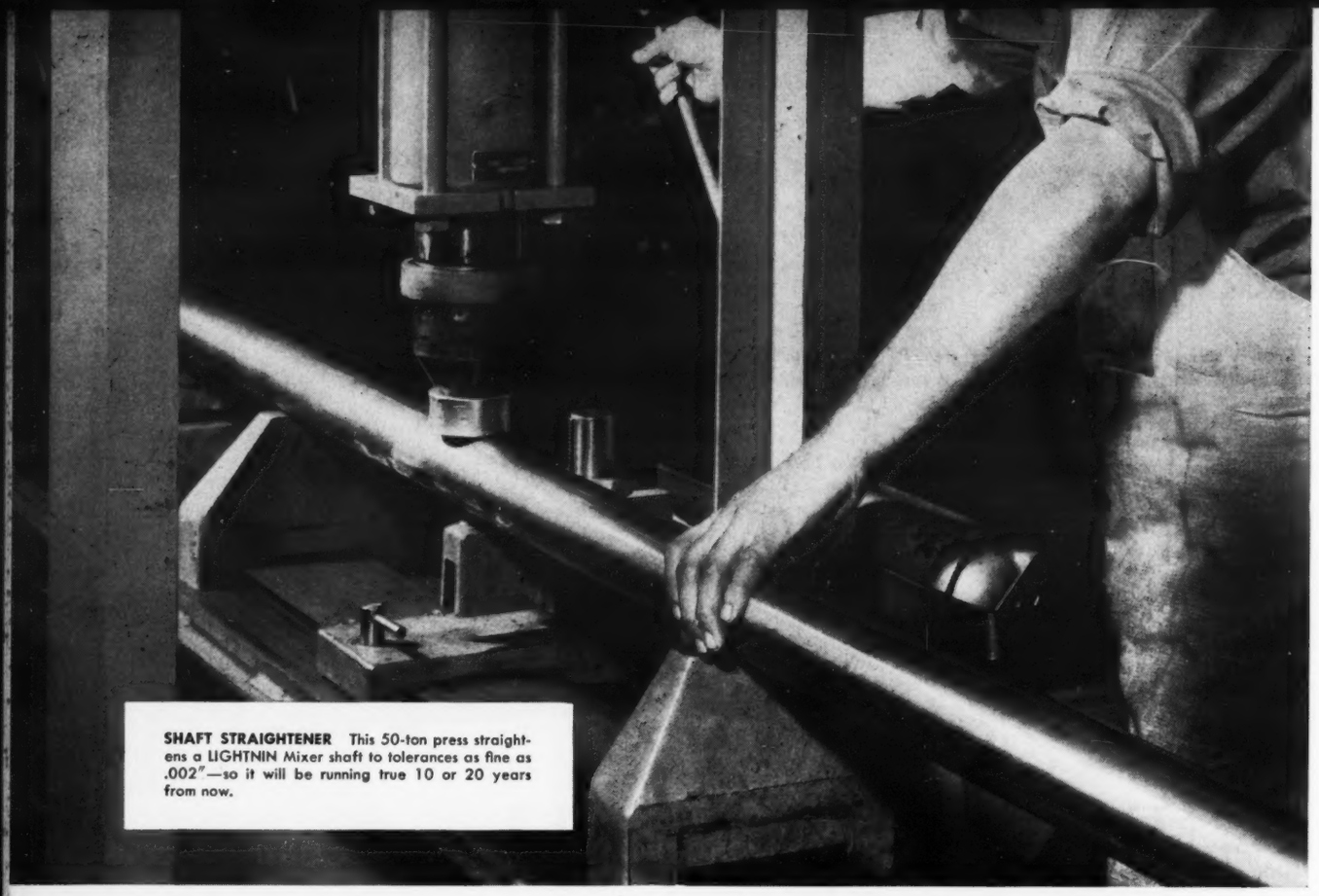
HORIZONTAL



SCRAPER

CUSTOM DESIGNED CONTINUOUS FILTRATION

When inquiring check 4129 opposite last page



SHAFT STRAIGHTENER This 50-ton press straightens a LIGHTNIN Mixer shaft to tolerances as fine as .002″—so it will be running true 10 or 20 years from now.

How to prevent **shaft failure** *when you mix fluids mechanically*

An out-of-line shaft on a mechanical mixer can be bad for your process, in more ways than one.

A shaft that bends or breaks may not cost much to replace—but can cost plenty in downtime. Even a slight misalignment in the shaft can set up stresses leading to shaft breakdown. And an off-true shaft makes it impossible to operate a stuffing box or rotary mechanical seal efficiently.

Importance of straightness

That's why every LIGHTNIN Mixer shaft must pass the test shown above, so it will run true when it gets into your tank.

The *shaft straightness* you get when you specify LIGHTNIN Mixers means several important economies.

For example, you can use two different metals in the same two-piece rigidly coupled shaft: corrosion-resistant alloy in the tank, plain steel above the splash line. This two-piece construction has many other advantages; it's possible only because of the most careful straightening and machining.

Know what shaft will do

You can draw on a wealth of cost-cutting shaft application data, too, when you mix with LIGHTNINS. What's the most economical shaft diameter that lets you skip the upkeep of a submerged steady bearing in the tank bottom? How can you avoid paying for excessive "safety factor" in an overhung shaft that must run smoothly during draw-off? We can give you the right answers, quickly and without guessing—based on thousands of test runs in a uniquely equipped fluid mixing laboratory.

This extra care in shaft design and application is just one example of a *way of thinking* that goes to work for you when you unload a fluid mixing problem on a specialist engineering firm like MIXCO.

It's one more reason why you get surer, more efficient fluid mixing—better process results — when you specify LIGHTNIN Mixers.

For quick, competent help on fluid mixing operation, call in your LIGHTNIN representative. He's listed in Chemical Engineering Catalog. Or write us direct.

Lightnin® Mixers

MIXCO fluid mixing specialists

SHAFT DEFLECTION TEST records the play of fluid forces on LIGHTNIN Mixer impeller and shaft. Data permit accurate prediction of shaft critical speeds, and most economical shaft selection for a given mixing job.

FOR LATEST MIXING INFORMATION and full description of LIGHTNIN Mixers, send for these helpful bulletins:

- ☐ B-102 Top or bottom entering; turbine, paddle, and propeller types: 1 to 500 HP
- ☐ B-103 Top entering; propeller types: ¼ to 3 HP
- ☐ B-108 Portable: ⅛ to 3 HP
- ☐ B-104 Side entering: 1 to 25 HP
- ☐ B-112 Laboratory and small-batch production types
- ☐ B-109 Condensed catalog showing all types
- ☐ B-111 Quick-change rotary mechanical seals for pressure and vacuum mixing
- ☐ B-107 Data sheet for figuring mixer requirements

Check, clip, and mail with your name, title, company address to:

MIXING EQUIPMENT Co., Inc., 185-f Mt. Read Blvd., Rochester 11, N. Y.

In Canada: Greey Mixing Equipment, Ltd., Toronto 10, Ont.

Polyethylene granulated at rates up to 75 lb/hr by efficient unit

Uses: Granulating and pelleting polyethylene, PVC, and other thermoplatic materials.

Features: Granulation is accomplished by means of perforated cylinders. Large unit can turn out 375 lb per hr of 3 mm x 4 mm granules.

Description: In operation, two meshing hollow gears (cylindrically shaped), with round or shaped perforations leading through roots of teeth, to inside of cylinders, draw material from feed hopper. The rotating gears force material through perforations. Granules emerging from perforations are removed by knife fastened to each gear.

Granulation is performed by means of perforated cylinders inside machine

Machines are available in two sizes. Small unit measures about 80x40x 50″ high. Large model is 96x60x 57″ high. Other specifications are:

Model	GR2000/200K	GR4000/400K
Granule diam, mm	3	3
Cylinder diam, mm	200	400
Power, hp	5	30
New weight, lb	2500	11,000
Capacity, lb/hr*	50	375

*Processing low pressure polyethylene or PVC. Granule size 3 mm x 4 mm

(Hutt Granulators are available from Peerless Confectionery Equipment Co., Dept. CP, 158 Greene Street, New York 12, N.Y. Check 4130 opposite last page.)

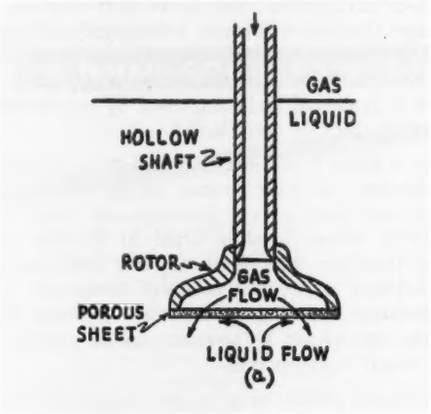
For more information on product at left, specify 4131 . . . see information request blank opposite last page.

Ultra-fine dispersion created by gas-liquid contact unit . . .

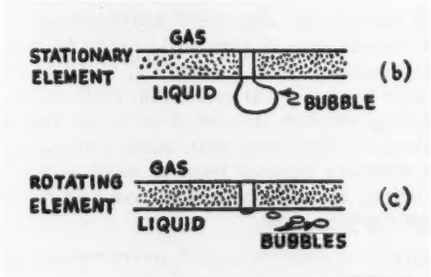
dispersion of gas not dependent on turbulence of liquid

Uses: For hydrogenation or other gas injection in liquids where very fine dispersions are required. Device is presently best suited for simple aeration of water or similar liquids.

Features: Dispersion of the gaseous phase does not depend on liquid phase turbulence as in ordinary rotary dispersion systems. Air in water dispersion is so fine that it appears milky. When device is used for aeration in basins, no air pressure supply is required.

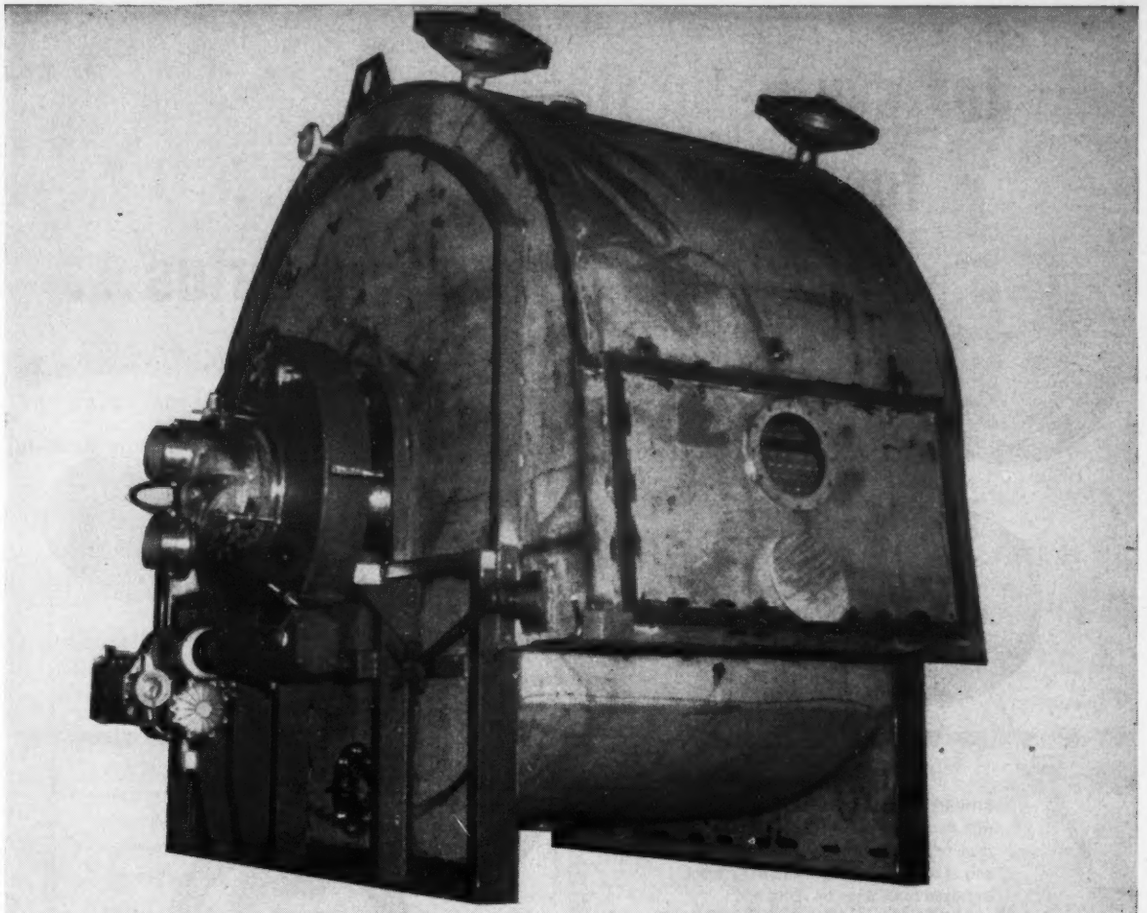


Description: Apparatus (see (*a*) above) consists of a hollow shaft and a rotor carrying a flat porous stainless steel cover. These are rotated at high speed — about 3600 rpm for simple water aeration — in the liquid.



As the gas emerges (see (*b*) and (*c*) above) on the liquid contact surface of the porous sheet it is sheared away by the liquid. Bubbles that form do not grow to any extent under these conditions, and resultant dispersion is extremely fine.

(Information concerning this gas-liquid contact apparatus can be obtained from R. E. Gunther, Dept. CP, Princeton Junction, New Jersey . . . or for more information check 4132 opposite last page.)



EIMCO FILTERS . . . CUSTOM-BUILT to FIT the JOB

Shown above is another Eimco custom built filter . . . quality designed for continuous vacuum operation to fit the specific needs of a chemical processing firm.

Solution to this customer's filtration problem began at The Eimco Research and Development Center.

Through highly practical pilot plant tests, Eimco defined control factors, measured the effects of varying conditions and was able to present accurate conclusions to this firm's engineering staff. The result: A filter designed and built to efficiently handle the required job.

Eimco can guarantee duplication of pilot plant results in commercial size filter stations because new filtration methods and designs provide a wide selection of "tools" to handle tough slurries efficiently and economically. Some of these Eimco designs are: Hy-Flow anti-friction valves and piping . . . enclosed vapor tight hoods . . . air actuated diaphragms for control of compression rolls . . . and Snap Blow discharge.

Eimco knows that variables in filtration (however slight they may seem) are too numerous to get effective coverage from "production-line" manufacturing. We are convinced that successful operation in any flow sheet depends on careful analysis by Eimco specialists and equipment individually constructed on basis on their conclusions.

We solicit an opportunity to show you the benefits of this dependable engineering service.

THE EIMCO CORPORATION
SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois • Process Engineers Inc. Division, San Mateo, California
Export Offices: Eimco Building, 51-52 South Street, New York 5, N. Y.
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

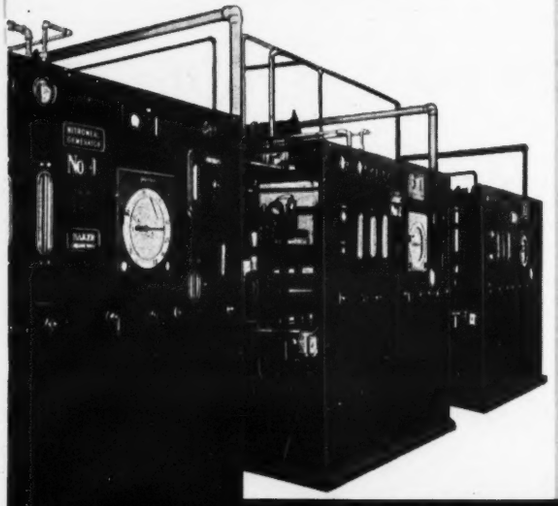
B-259

When inquiring check 4133 opposite last page

for synthetic fibers...
for producing nitrogen...
for pressurized apparatus...

SPINNERETTES...
for synthetic fibers . . . unique in industrial production. Delicate, precision units that are the foundation of an entire manufacturing process. Made of purest metals, under strictest scientific control.

NITRONEAL® GAS GENERATOR...
with a controllable hydrogen content—produces oxygen-free gas consisting only of nitrogen, hydrogen and water vapor. Hydrogen content can be varied and maintained as desired between 0.25% and 25%.



RUPTURE DISCS...
discs of precious metals, resistant to most corrosive agents and unattacked under conditions that base metal discs could not withstand. Specific physical properties ensure bursting only at the predetermined pressure.

Write for complete catalog material and details.

BAKER PRECIOUS METALS

BAKER & CO., INC.
113 ASTOR STREET, NEWARK 2, NEW JERSEY
NEW YORK • SAN FRANCISCO • LOS ANGELES • CHICAGO
ENGELHARD INDUSTRIES

RESEARCH MAINTAINS BAKER'S LEADERSHIP IN PRECIOUS METALS

When inquiring check 4134 opposite last page

Filtering Aluminum Hydroxide

Starts on page 152

163 sq ft of filtering area. Drum is covered with light cotton filter cloth and revolves in a tank filled with slurry. An agitator keeps solids in suspension and filter-cake build-up uniform.

Surface of drum is divided into shallow compartments which are connected to an automatic valve so that vacuum can be applied to each individually and successively. A sprial drainage member separates cloth from drum so that there is space for liquid to drain from all parts of compartment into suction line.

Filter is equipped with both wash and compression mechanisms. Highly absorbent endless cotton felt wash-blanket presses from above filter-cake after it emerges from slurry. Blanket is thoroughly and evenly wetted from above by non-atomizing wash water distributors. There is no channeling of gel on drum. Cake is dewatered and compressed by two compression rolls that ride over blanket.

Cake is lifted from drum by linen-string discharge mechanism. As filter rotates, strings pass around drum and down over a discharge-roll where they make an abrupt bend in order to dislodge cake. They then pass through an aligning comb and are guided back on drum by means of return roll. Cake is discharged to trough in a continuous sheet. Filter fabric replacement is necessary on an average of once every eight months.

A measured amount of pure water is pumped from a re-slurry tank through aluminum hydroxide receiving trough and back to re-slurry tank throughout entire batching operation, thus producing a pure aluminum hydrate suspension having a final controlled concentration.

Results: Within a month the new equipment was operating smoothly enough for production to shut down in both of the old processing areas. Four batches are run every working day, more than double amount previously produced — and in less working area. It takes 1¾ hr to complete a single batch, so that entire four-batch operation including clean-up is easily handled by two men working an eight-hour shift. Based on labor costs, two men now produce twice as much as six men did before. Filter is reported to have paid for itself in labor savings alone.

(Design and construction of rotary vacuum filter was performed by Filtration Engineers, Inc., Dept. CP, 155 Oraton St., Newark, N.J. . . . or for more information check 4135 on form opp. last page.)

Your guide . . . to more processing equipment and ideas is the alphabetical product directory beginning on page 237

Buy | BOTH TYPES OF CONDENSER TUBE FROM WOLVERINE

To meet the heat transfer needs of the refining and processing industries, Wolverine Tube manufactures condenser tubing in both integrally finned and prime surface form. Each type is the product of Wolverine Tubemanship—is backed by Wolverine's years of tubing experience, constant research, sound engineering and rigid quality control.

FINNED CONDENSER TUBE

Wolverine Trufin® Type S/T was designed specifically for shell and tube installations. This integrally finned condenser tube steps up heat transfer performance because its extended surface extracts more BTU'S per foot of tube.

Type S/T is available in the following alloys:

- Copper
- 70-30 Cupro-Nickel
- 90-10 Cupro-Nickel
- 85-15 Red Brass
- Admiralty
- Electric-welded Steel
- Seamless Steel
- Aluminum Brass

SIZE RANGE:

Specified O.D.

1/2" • 5/8" • 3/4" • 7/8" • 1"

PRIME SURFACE TUBE

For those heat transfer applications where integrally finned tube is not applicable, Wolverine recommends its prime surface condenser tube. This tubing is rigidly quality controlled to insure maximum performance under the toughest of operating conditions.

Wolverine Prime Surface tube is available in the following alloys:

- Inhibited Admiralty
- Copper
- Cupro-Nickel 10, 20, 30%
- Aluminum Brass
- Red Brass
- Muntz Metal
- Aluminum

SIZE RANGE:

Outside Diameter	Wall Thickness
5/8" O.D. to 2" O.D. Inclusive	.049 to .083
	.049 to .134

FIELD ENGINEERING SERVICE

For the convenience of its customers Wolverine maintains its Field Engineering Service—a staff of highly trained tubing technicians. These heat transfer and tubing specialists are trained to come up with the right solutions to problems in design, corrosion alloys, etc. Their services are yours without obligation—can help assure you of complete tubing satisfaction.

Wolverine Trufin is available in Canada through the Unifin Tube Company, London, Ontario.

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES.

•

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1469 CENTRAL AVE., DETROIT 9, MICH.

Manufacturers of Quality Controlled Tubing and Extruded Aluminum Shapes

WOLVERINE TRUFIN® BOOSTS ASPHALT HEATER EFFICIENCY

Finned Tube Exchangers on Stream Three Years

BY ERNEST DODD

Until recently in processing work, such heat transfer applications as heating asphalt, crude oil and other heavy residuum materials have been regarded as "tough, dirty jobs."

However, a new day has dawned. Now, thanks to Wolverine Trufin—the integral finned condenser tube—you can heat viscous materials as easily and with as good results as many clean service materials.

As proof of this, consider the performance of two shell and tube U-bend heat exchangers which are used by a Pennsylvania company to heat asphalt, as it moves through transportation lines from the processing plant to storage or distribution.

The exchangers operate with steam on the tube side and asphalt on the shell side. Each is tubed with 112 lengths of Trufin Type S/T, electric-welded steel tube in prefabricated U-bend form. Each has a total surface area of 1600 square feet.

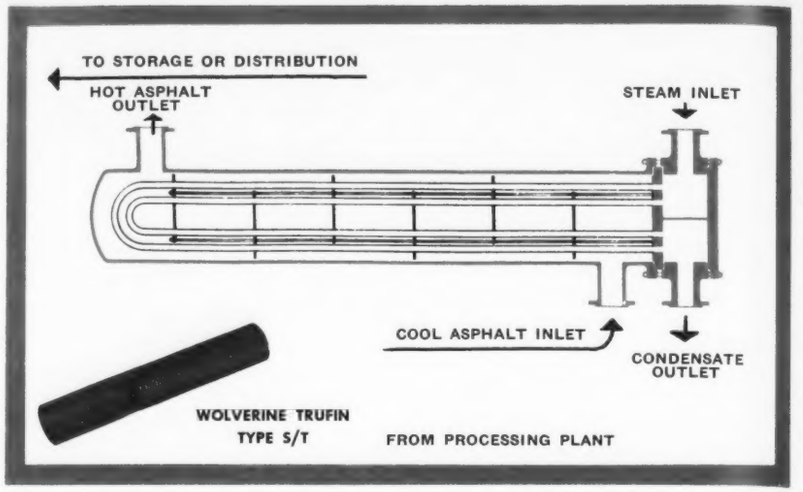
These two units have been continuously on stream for three years and are still going strong. During this time they have not required cleaning or retubing.

Performance such as this, however, is no longer regarded as unusual—when heat exchangers or condensers are tubed with Wolverine Trufin Type S/T condenser tubes.

Through actual on-the-job use, plus extensive pilot plant research and exhaustive laboratory testing, engineers are proving that integral finned Wolverine Trufin resists fouling for longer periods than does prime surface tube.

In addition to increasing on stream time, Trufin also boosts heat transfer capacity because its extended surface extracts more BTU's per foot of tube. As a result, units tubed with Trufin require fewer tubes and smaller shells to obtain equivalent heat duty. The savings in material, labor and construction time are substantial.

For example, the asphalt heaters described in this article, require 116 lengths of Trufin enclosed in 17¼" I.D. shells to obtain individual heat transfer surface areas of 1600 square feet. If designed around prime surface tube, each unit would have required approximately 234 tubes and shells 25" in diameter.



WOLVERINE ONLY DIRECT MILL SOURCE FOR U-BEND CONDENSER TUBES

Through the use of prefabricated Wolverine U-bends in the asphalt heaters described on this page, the engineers concerned realized substantial savings in time, materials and labor.

As the industry's only direct mill source, Wolverine prefabricates U-bends to customer specifications. The tubes are then shipped in expendable type pallets in the exact order of their installation—ready for direct insertion into the unit.

One tube sheet is eliminated and floating head problems are reduced. Rolling in operations are cut in half. Wolverine U-bend tubes also eliminate the shipping and handling problems present when requirements call for condenser tubes over 30′ long.

Wolverine prime surface U-bend tubes are available in a wide range of sizes and alloys in copper and aluminum. Capacity-boosting Trufin U-bends are available in copper, copper-base alloys, aluminum, electric-welded and seamless steel.

SEND FOR FREE BOOK

Because of the nature of its contents Wolverine's Condenser Tube Catalog can serve as a worthwhile addition to engineering reference files. Besides descriptions of Wolverine's complete condenser tube line this catalog contains valuable information on alloys, corrosion, finned tube and its applications and many other subjects of direct interest to those engaged in heat transfer work. Send for your FREE copy today.

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Rotating shelves assure even drying in freeze-drying apparatus . . .

revolve at one rpm in front of radiant heating source

Uses: Freeze-drying various substances in chemical and pharmaceutical fields.

Features: Uneven drying is avoided and even sublimation is assured through use of rotating trays which revolve at one rpm in front of radiant heating source.

Description: Drying apparatus is compact and is equipped with a one liter trap for handling condensate. Though small and inexpensive, dryer can handle 300 five-ml or 264 ten-ml serum bottles at one time. Racks can be adjusted to accommodate

Compact freeze-drying apparatus can handle 300 five-ml serum bottles at one time

beakers, petri dishes, centrifuge tubes, test tubes, or other containers. Masses such as leaves or plants are easily contained in the racks. Dryer is 12½" high x 23½" long x 15½" deep. Control panel and recessed McLeod gage is mounted on cabinet.

(Roto-Freeze drying apparatus is product of E. Machlett & Son, Dept. CP, 220 East 23rd Street, New York 10, New York . . . or for more information check 4136 on form opposite last page.)

For more information on product at left, specify 4137 . . . see information request blank opposite last page.

RIGHT! KINNEY SPANS THE WHOLE SUBJECT OF HIGH VACUUM

With the most extensive line of High Vacuum Pumps in the world, KINNEY encompasses the needs of laboratory, pilot plant and full scale production. The heart of your High Vacuum system is, obviously, the Pump . . . and it is certainly true that the performance of your system is definitely circumscribed by the capabilities of the Pump you select. The significance of the KINNEY name and KINNEY performance in High Vacuum work cannot be overemphasized.

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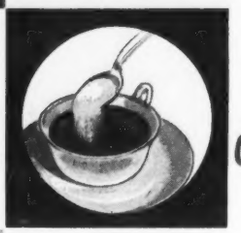
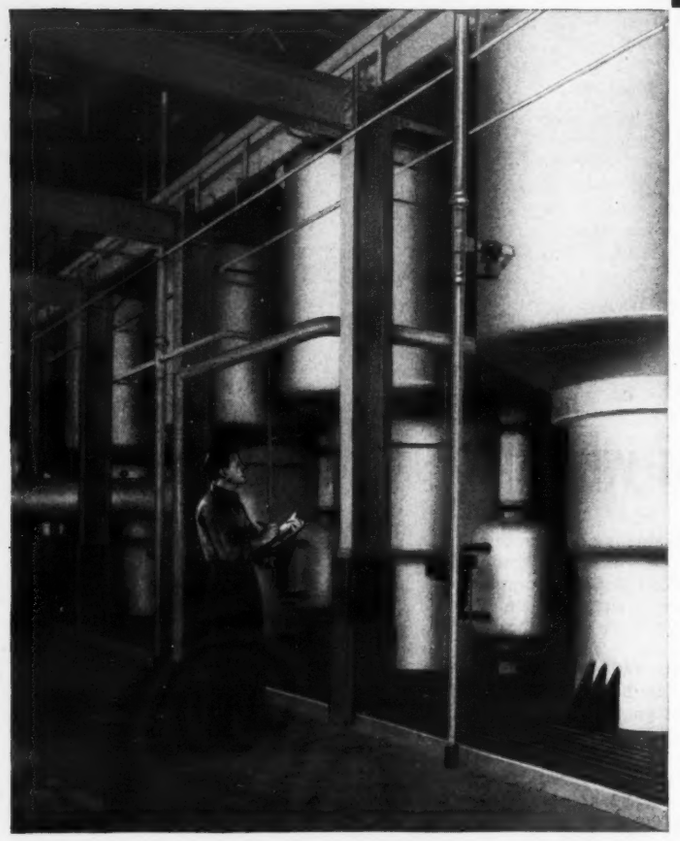
...ANOTHER RESULT OF IMPROVED PROCESSING

SWENSON EVAPORATORS

help produce better sugar...



at lower costs



Refiners of beet sugar are experiencing new success through an improved method of processing—Swenson Multiple-Effect Evaporation. Swenson high-velocity LTV pressure evaporators are generating essentially all of the process vapors used in modern beet sugar factories. Heat economies of approximately 500,000 BTU per bag of sugar are being obtained. Food, chemical, pharmaceutical—almost every type processing industry—has profited substantially from Swenson Evaporation equipment. The reason: Swenson Evaporators can improve product quality while lowering production costs. *Your* product could be next. The surest way to find out is to talk with a Swenson engineer. Call or write today.

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Since 1889

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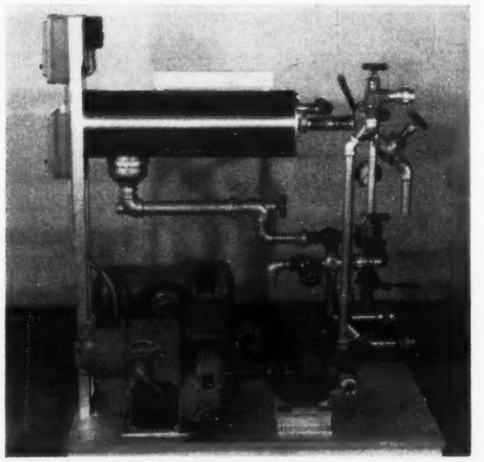
Starch cooked continuously in compact unit . . .

occupies only 30x48" floor space, operates fully automatically, handles various concentrations

Uses: Cooking starch continuously in paper, textile, food, and other fields.

Features: Compact unit occupies only 30x48" floor space and operates fully automatically. Cooker has low initial cost (below $3000), and handles wide range of concentrations at various flow rates.

Description: Cooker consists essentially of a pressure chamber, two positive displacement pumps, and automatic pressure and temperature controls. Cooking may be conducted either above or below 212°F and at pressures from 140 to 160



Continuous starch cooker can easily cook 25% paste of unmodified cornstarch

psi (lower pressures may be used in some cases). Cooker chamber has no moving parts, making maintenance on unit almost negligible. Occasional repacking of pumps is the only service required.

Pumps are powered by variable-speed drives. One pump is used to feed slurry, and its capacity can be varied from 0.5 to 5.0 gpm. Other pump handles water. It can be adjusted to pump from 5.0 to 20.0 gpm. By appropriate selection of pump speeds, wide range of concentrations and product rates can be obtained.

Adjusting concentration of feed slurry further enlarges range of possible concentrations and delivery rates. Unit easily cooks 25% paste of unmodified cornstarch. In many installations, pressure from cooking chamber is sufficient to move product to its end use location, thereby eliminating need for extra pump.

(Continuous starch cooker is product of Thermal Equipment Corporation, Dept. CP, 4820 Searle Parkway, Skokie, Illinois . . . or for more information check 4140 on form opposite last page.)

Heavy-duty crutchers can mix wide range of materials

Uses: Mixing chemicals and soap stocks of broad viscosity range.

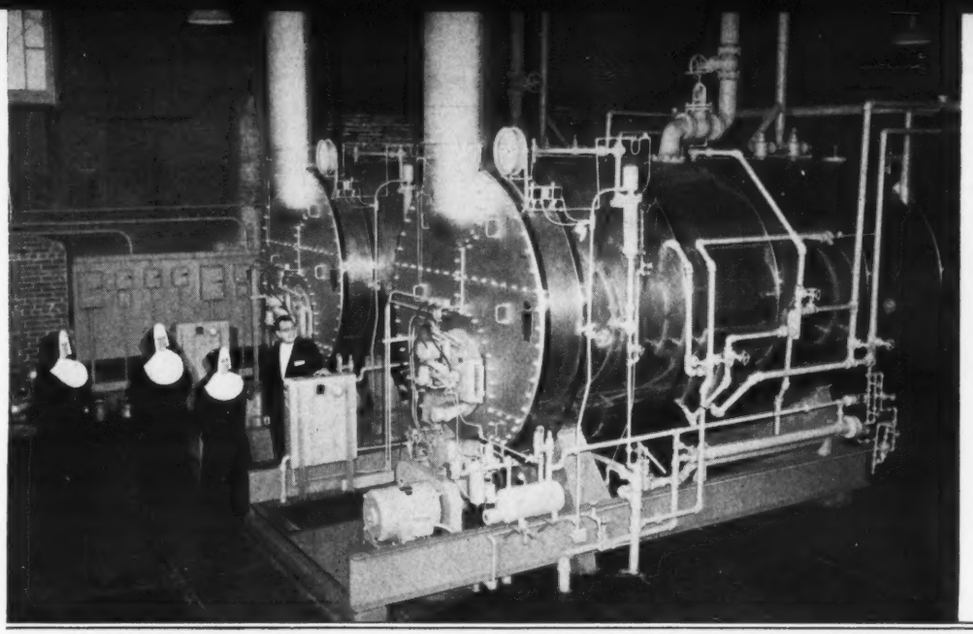
Features: Unit's heavy-duty power and construction make it capable of mixing thick, viscous materials. Variable-speed drive, adjustable between 23 and 93 rpm, permits matching of impeller speed to various processing conditions and types of materials.

Description: Draft tube of mixer is adjustable to permit mixing of different size batches. Several types of screw or vane mixing blades are available. Batch is emptied and bottom of unit cleaned by sweep paddle at inner base of mixer. Various size units are available. Tanks can be of mild steel or with inside surfaces of stainless steel or Monel. Units can be furnished jacketed for heating or cooling.

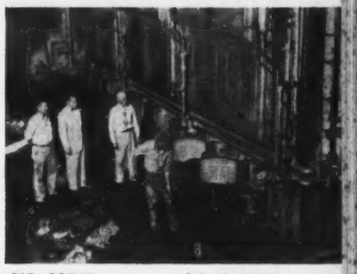
Units are available in various sizes. This one, 7' high by 6' in diameter, has capacity of 1400 gallons

(Crutchers are product of Houchin Machinery Co., Inc., Dept. CP, Hawthorne, N. J. . . . or for more information check 4141 on form opposite last page.)

For more information on product at right, specify 4142 . . . see information request blank opposite last page.



NEW BOILERS combine efficiency and handsome appearance. Edward S. Green, Edgemont (Pa.), contractor, was responsible for this superior installation. Pictured left to right are: Sister M. Cor Immaculatum, Immaculata College Treasurer, Sister Jean Marie, Community Treasurer, Reverend Mother Maria Alma, Superior General and Salvatore S. Guzzardi, Consulting Engineer.



OLD BOILER was a coal-fired HRT model — typical of many replaced by modern Cleaver-Brooks oil, gas or combination oil/gas fired boilers.

Consulting engineer* tells how Immaculata College boiler modernization saves estimated $12,000 each year

Salvatore S. Guzzardi CONSULTING ENGINEER
2928 LEWIS TOWER · PHILADELPHIA 2, PA · KINGSLEY 6-2777

December 20, 1956

Mr. John C. Cleaver, President
Cleaver-Brooks Company

Dear Mr. Cleaver:

Recently our office was retained to make an impartial, exhaustive engineering study of the 40-year old boiler plant and steam system at Immaculata College, Immaculata, Pa., which is staffed by the Catholic order, Sisters of the Immaculate Heart of Mary.

As a result of our recommendations, two fully automatic, oil-fired, 350 bhp Cleaver-Brooks package steam boilers, (12,000 lbs/hr steam each), replaced three hand-fired coal boilers and steam-driven auxiliaries. The new boilers are operating at approximately 80% boiler efficiency year-round.

Conversion of coal firing to automatic #6 oil firing and increased boiler efficiency has reduced the fuel cost approximately 50% -- amounting to a saving of $12,000 each year.

The Cleaver-Brooks boilers burn #6 oil and operate automatically at 80 pounds steam pressure 'round the clock -- without the presence of operators in the boiler room. Eliminating boiler plant labor saves the College $7,500 each year.

The cost of the boiler plant modernization will be paid for out of fuel and labor savings in approximately 2-1/2 years.

Commendation for this outstanding performance of the Immaculata boiler plant is due to your well-engineered boiler design and to the cooperation of your skilled servicemen. The results achieved were so impressive that the Sisters subsequently modernized their Villa Maria Convent, Westchester, Pa., with two 100-bhp Cleaver-Brooks boilers.

Sincerely yours,
Salvatore S. Guzzardi

***Salvatore S. Guzzardi** — Award-winning head of an organization of experienced professional engineers specializing in modernizing power service facilities. Clients include: Pennsylvania University, Baldwin-Lima-Hamilton Corp., H. Daroff & Sons, Sun Shipbuilding & Dry Dock Co. and City of Philadelphia.

Surveys show 32% of boilers now in service are 30 years old; 56% are over 20 years old

If your boiler fits this description, we recommend an immediate survey. "In 90% of the plants surveyed," summarizes Mr. Guzzardi, "we have found it possible to save thousands of dollars and to pay for the recommended improvements out of annual savings within one to three years."

Again and again the proved economy of Cleaver-Brooks four-pass, forced-draft boiler design results in savings reports as impressive as this. Contact your nearest Cleaver-Brooks representative for more facts on the complete line of steam and hot water boilers — 19 sizes, 130 models, 15 to 600 hp — for heating or processing. Or write Cleaver-Brooks Company, Dept. G, 349 E. Keefe Ave., Milwaukee 12, Wis., U.S.A. Cable Address: CLEBRO — Milwaukee — all codes

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ORIGINATORS OF SELF-CONTAINED BOILERS

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ROTARY
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(Trade Mark — Patented)

America's Most Reliable
Rotating Joint

It takes about 15 minutes to install the ROTARY UNION. It will give your thousands of hours of leakproof service without mechanical maintenance of any kind because it is self-adjusting to pressure and self-aligning. Ball bearing construction gives smooth sealing at high speeds with a minimum of power.

Standard ROTARY UNIONS are available in 40 types in pipe sizes from ¼" through 5", for applications through a complete range of pressures, temperatures, and speeds. Hundreds of variations meet every industrial need.

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SPECIALLY DESIGNED ODOR CONTROL CHEMICALS
FOR MALODORS TRACEABLE TO

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Alamask odor control chemicals reduce the intensity of a wide variety of obnoxious malodors such as these, found in both processing operations and finished products. Rhodia's technical engineers will offer specific recommendations to solve your odor problems. Samples and directions for use are available upon request.

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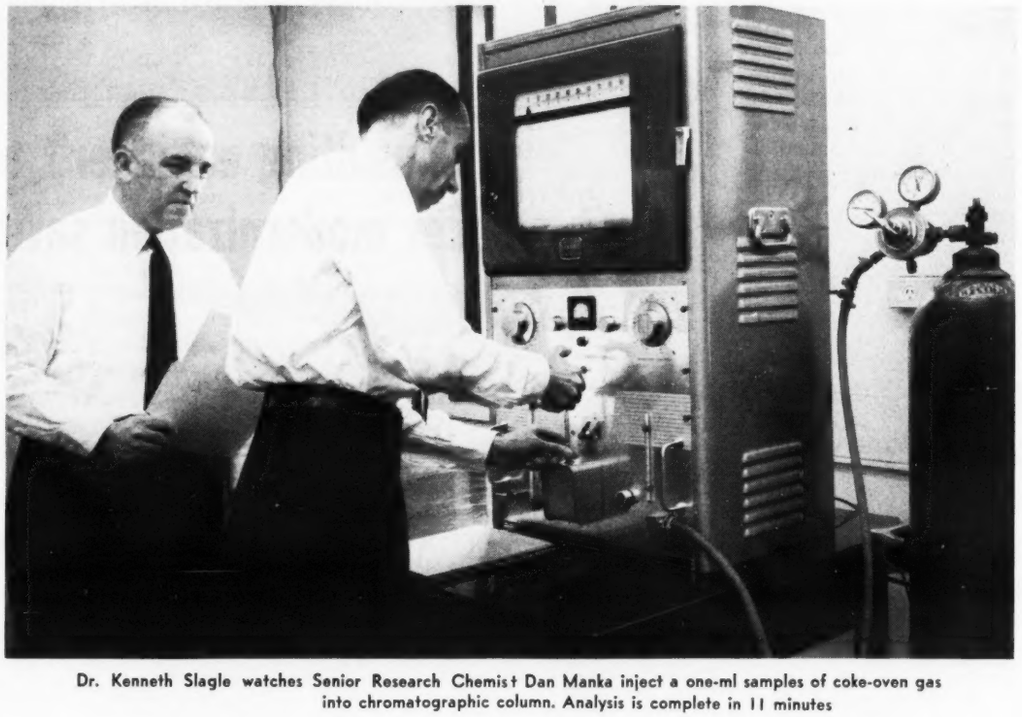
Orsat method for analysis of gas was requiring up to four hours. Switch was made to gas chromatography.

Now . . . complete gas analysis is run in fif



Dr. Kenneth Slagle watches Senior Research Chemist Dan Manka inject a one-ml samples of coke-oven gas into chromatographic column. Analysis is complete in 11 minutes

WILLIAM C. CLARKE, Assistant Editor

With **DAN P. MANKA,** Senior Research Chemist
DR. KENNETH SLAGLE, Section Head — Coal Chemicals Research Laboratory
Jones & Laughlin Steel Corporation
Pittsburgh, Pennsylvania

Problem: Studies of coal-based chemicals from coke-oven sources at Jones & Laughlin's Research Laboratory were seriously handicapped by the time required to analyze each gas sample by the usual Orsat absorption method. Three to four hours were needed to run each Orsat analysis, and some components could not be separated without even longer analyses.

Coke-oven gas, from which coal tars, ammonia, benzene, toluene, and related materials have been removed, is usually a mixture of hydrogen, methane, carbon monoxide, ethane, carbon dioxide, nitrogen, and illuminants.

Solution: Within the past year a gas-liquid partition chromatography apparatus was installed by the Laboratory for automatic analysis of special research gas samples. These research samples are similar in composition to coke-oven gas. A special column packing was developed by Dan P. Manka which not only increased speed of separation and resolution of components, but gave quantitative results that agreed within 0.2% with the Orsat analysis.

un in fifteen minutes

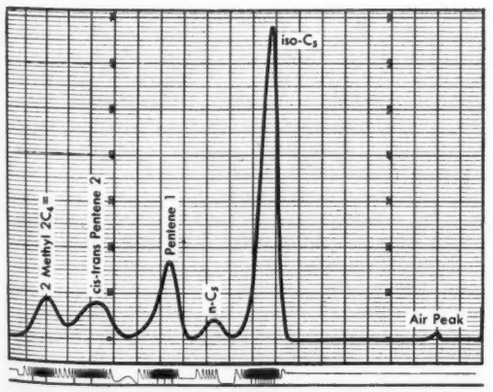
— both qualitative and quantitative — with mixtures of six or more components

Originally developed for analysis of petroleum products, gas-liquid partition chromatographic analyzer has been adapted for analysis of everything from flavors to coal chemical derivatives.

Helium is used ordinarily as carrier gas. Small quantities of gas or volatile fluids are transported through a fourteen-foot packed column. Finely-sized, inert granules, as fired diatomaceous earth, are used as packing. Granules are also coated with a high-boiling liquid, tri-metacresyl phosphate, in which test-sample components dissolve to different degrees. Length of column plus coating of granules give resolution, with petroleum derivatives, equivalent to more than 1000 theoretical plates.

Separation column is enclosed in a thermostated air-bath whose operating temperature (35° to 160°C) is controlled by a 300-watt heater, together with a cycling heater for fine regulation. Heat of the air-bath causes liquid samples to flash-evaporate. Thus instrument will resolve compounds with

Turn to next page

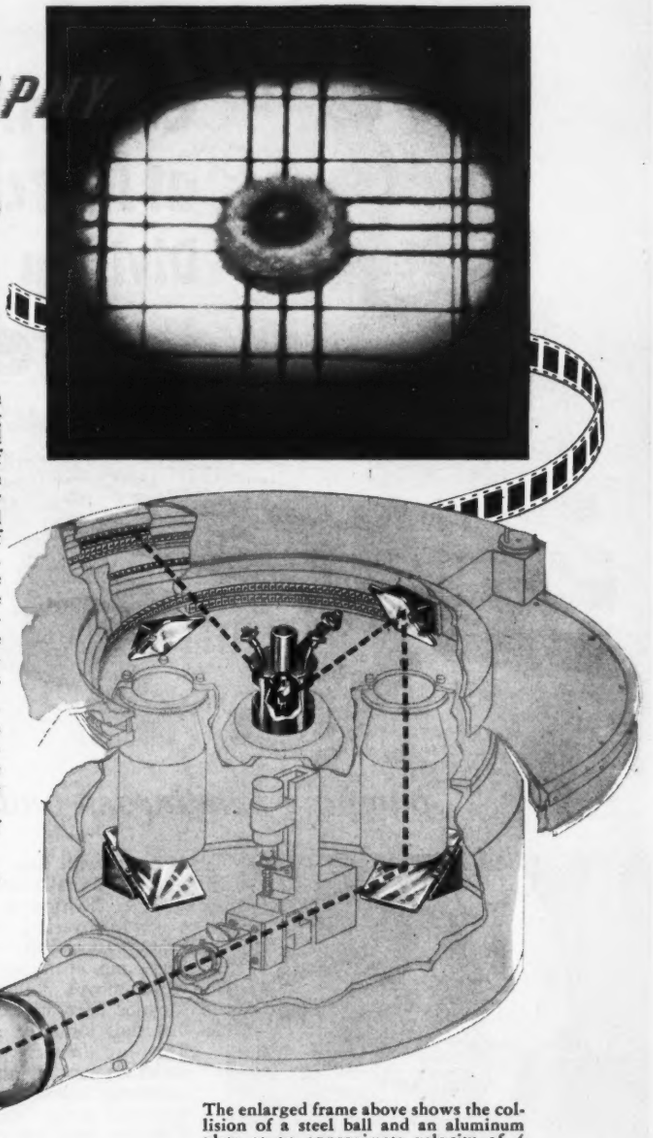


Typical chromatographic chart showing separation of a petroleum sample into five components. Number of pips under each peak, at bottom of chart, indicates relative percent of compound in sample

another example of exciting work at los alamos...

FAST PHOTOGRAPHY

15,000,000 PICTURES/SECOND



Here at Los Alamos, the development of high speed photography has produced framing cameras of unprecedented framing rates and exposure times. These cameras are capable of taking as many as 90 frames at rates as high as 15 *million* frames a second. They employ the technique of sweeping the image, reflected from a rapidly rotating mirror, over a set of correcting lenses onto the recording film. This results in the effective stopping of image motion within the frame. In addition to the creation of new optical components, the construction of these cameras has involved the development of techniques for rotating mirrors of substantial size at speeds as high as 22,000 revolutions *per second.*

Used in a wide variety of research programs as well as in the Laboratory's weapon investigations, instruments such as these typify the excellent resources, in facilities and in the capability for creating wholly new experimental methods, enjoyed by the scientists of Los Alamos.

For an illustrated brochure about Los Alamos write to:

Director of Personnel
Division 1802

The enlarged frame above shows the collision of a steel ball and an aluminum plate at an approximate velocity of 4 millimeters/microsecond, illustrative of studies of interaction of metals at high impact velocity. The cutaway drawing shows some of the features of one of the Laboratory's high speed framing cameras.

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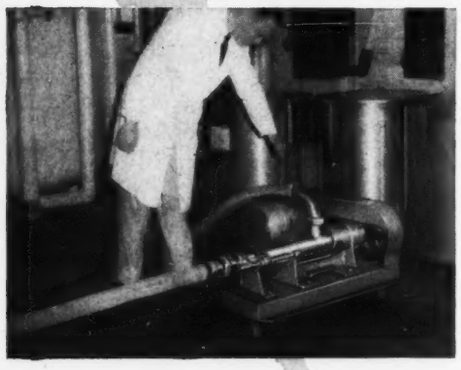
...pumping mouthwash and general alkaline solutions



Moynos, with their "progressive cavity" pumping principle, provide a vital production lifeline at Merck Sharp & Dohme, Division of Merck & Co., Inc. They use Moynos to pump a variety of products, from water-like mouthwash to heavy pastes with viscosities up to 20,000 centipoise. The pump at the left, with a capacity of 30 GPM at 600 RPM, moves mouthwash and general alkaline solutions. Moynos have enabled thousands of plants to pipe different materials formerly moved by hand and other expensive means. They are the only pumps that will handle many difficult materials such as abrasives, pastes, slurries, chemicals, foods, suspended solids, etc., without foaming, aerating, crushing or excessive pump wear.
Examine your processing methods. No doubt there are several places where Moyno Pumps can drastically cut costs. Ask us. We'll give you a prompt answer. Send us an outline of your problem today! Write for Bulletin 30-CP.

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SPRINGFIELD, OHIO — BRANTFORD, ONTARIO

Motors — Fans — Hoists — Moyno® Pumps — Propellair® (Industrial) Fans

When inquiring check 4145 opposite last page

Gas Analysis

Starts on page 164

boiling points considerably above the operating temperature.

Pressure change when a sample is injected registers on a recorder. When gases are analyzed, this starting mark is used as a zero-point for measuring retention times. With liquids, an "air peak", caused by a bubble of air drawn into the syringe to confine sample, appears after zero-point.

As sample mixture passes through chromatographic column, its various components travel at different rates and are swept out, one by one, into detector side of a low-current-thermistor thermal-conductivity cell. Corresponding change in conductivity is registered as a peak on a strip-chart recorder. Comparison of column retention time for each component with times required by pure materials serves to identify components.

Since area under each peak of recorded curve is a quantitative function of amount of material producing each peak, measurement of area serves as a method for quantitative analysis. Instrument has an automatic integrator which allows area to be rapidly calculated from number of "pips" under each peak on the recorded curve.

Results: Elimination of time-consuming Orsat analyses of gas samples has greatly increased the number of research samples that can be tested during a laboratory day. Formerly, an Orsat analysis took half a day. Now . . . a complete chromatographic analysis of these gas samples, with six or more components, can be run in less than 15 minutes and all calculations completed in 20 to 30 minutes. Complete analysis is performed in one operation by the gas-liquid chromatography apparatus, without loss of any components. In addition, instrument provides a permanent chart record of each analysis for filing.

Also . . . present Jones and Laughlin investigations on research mixtures should enable operators to use the instrument for quick, accurate, *routine* analyses of coke-oven gases.

(The Fisher-Gulf Partitioner is a product of Fisher Scientific, Dept. CP, 717 Forbes Street, Pittsburgh 19, Pa. Check 4146 opposite last page.)

Lists stainless-, carbon-steel furniture for industrial laboratories

Furniture and fixtures of stainless-and carbon-steel for industrial laboratories are listed and described in 12-page catalog. Specifications and construction details are included.

"Lustra Line" catalog is issued by The Warren Corp., Dept. CP, 2901 Brighton Rd., Pittsburgh 12, Pa. Specify 4147 opposite last page.

280 SERIES METERING VALVES for

precise control

20 TURNS moves the stem only 3/8"

For precision flow control use this brass bar stock metering valve, equipped with an O-ring stem seal. The extra long, sharp, needle point stem (8° included angle) and fine spindle threads insure accurate control for pneumatic or hydraulic service, or precision laboratory work. In ⅛" and ¼" pipe sizes. Your choice of 1/16" or 1/8" orifices. Available for Panel Mounting, too.

For complete information send for Bulletin No. BSV 256.

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2 STAGE CONTROL OPERATION WITH 1 MERCOID® PRESSURE CONTROL

AVAILABLE IN 17 PRESSURE RANGES FROM

0-30" VAC. TO 300-2500 PSI.

WITH THE SENSITIVITY YOUR APPLICATION REQUIRES

Mercoid DA-400 Series Pressure Controls are dual purpose controls, incorporating a single pressure element operating two separate, independently adjustable Mercoid magnetic switches. The switches may be used for multiple circuit control for various operations as the control responds to pressure changes.

AVAILABLE FOR FOLLOWING OPERATIONS:

SPECIFICATION No. 4122. One circuit opens on increase of pressure—second circuit opens on further increase of pressure.
SPECIFICATION No. 4129. One circuit closes on increase of pressure—second circuit closes on further increase of pressure.
SPECIFICATION No. 4132. Both circuits open at intermediate pressure. One circuit closes on increase of pressure above neutral zone—second circuit closes on decrease in pressure below neutral zone.
SPECIFICATION No. 4123. Both circuits close at intermediate pressure. One circuit opens on increase of pressure above neutral zone—second circuit opens on decrease in pressure below neutral zone.

WRITE FOR BULLETIN NO. 92.

THE MERCOID CORPORATION
4201 BELMONT AVE., CHICAGO 41, ILLINOIS, U.S.A.

When inquiring check 4149 opposite last page

Doesn't need grease for tight seal . . .

Teflon plug is self-lubricated for non-freezing operation

Uses: As stopcock for laboratory glassware.

Features: Teflon plug has self-lubricating property which provides "non-freezing" operation and operates smoothly over a wide temperature range.

Teflon stopcock plug has Kel-F nut to hold it in place

Description: Teflon stopcock plug is held in place by Kel-F nut and cannot loosen during use. Unit can be used for pressure applications and handling hazardous liquids. Normal vacuum applications can also be handled.

(Lab-Crest stopcock is product of Glass Division, Fischer & Porter Company, Dept. CP, 822 Jacksonville Road, Hatboro, Pa. . . . or for more information check 4150 on form which is located opposite last page.)

Describes mesh matting of neoprene

Data sheet provides description, uses, and characteristics of neoprene mesh matting for industrial and institutional applications. Drawings illustrate typical uses in laboratory.

Form A-229 is issued by American Mat Corp., Dept. CP, 2018 Adams St., Toledo 2, Ohio. When inquiring specify 4151 on form which is located opposite last page.

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CRAWFORD FITTING COMPANY
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When inquiring check 4152 opposite last page

ADVERTISEMENT

E-D Filter Paper Makes Excellent Cover For Cloth Or Other Filter Media

Provides Greater Clarity Of Filtration And Prolongs Life Of Filter Medium

FILTERTOWN, USA. Field reports prove that there is an increasing use of E-D filter papers, with the greatest demand for grade # 953, as a cover for cloth or other filter media in industrial filtration. To date, this practice has been widely adopted in plants which process oils, including coconut, cod liver, corn, cooking, linseed, soybean, and vegetable oil. These plants manufacture margarine, salad oil and shortening, soaps, paint, varnish, and many other products.

Great Savings In Time And Money

Actual experience, in hundreds of cases, has proven to the satisfaction of production officials that it is far more economical to cover the cloth or other filter medium with E-D filter paper and then, when the press needs redressing, to simply peel off the paper, discard it, and replace with a clean E-D filter paper cover. Substantial savings in press running time are made.

E-D filter paper holds up solid particles to such a degree that there is often little need for recirculating the slurry to obtain an adequate cake deposit for clear filtration at the start of a cycle.

Moreover, the E-D filter paper protects the filter medium from slimy fines, thus prolonging its useful life, saving additional money on media expenditures. The cost of E-D filter paper is so little, in comparison with the cost of other filter media, that these savings are important.

Greater Clarity Of Filtrate Obtained

Because of its fine porosity and unique uniformity of furnish, grade #953—as well as the many other grades of E-D filter paper—obtains exceptional clarity of filtrate. Many degrees of rapidity and porosity are available in the more than 50 regular grades manufactured by The Eaton-Dikeman Company. Special grades are also made to meet individual requirements.

Free Samples Available

Actual tests made at the user's plant furnish convincing proof of the many advantages that are possible. Simply write for E-D's Filtration Analysis Report. When the necessary facts are supplied, you will receive several recommended grades, cut to your own size and specifications, at no charge. Make the necessary test runs and you will soon be able to determine the benefits for yourself. There is no charge or obligation for this service.

Write to Thomas H. Logan, Jr., care of The Eaton-Dikeman Company, Filtertown, Mount Holly Springs, Pennsylvania for prompt attention.

This company is the only company in America that is exclusively engaged in the manufacture of filter paper for science and industry. Authorized representatives and dealers are located in every section to provide service and helpful information on all problems relating to liquid filtration.

When inquiring check 4153 opposite last page

LABORATORY

Speeds pipet drying time and reduces breakage

with extra rack, one batch dries while another washes

Uses: As pipet dryer for laboratories where constant use of pipets requires a continually-clean supply.

Features: Pipet dryer reduces hazard of breakage as compared with manual handling methods and speeds time of drying.

Description: Dryer will handle pipets to 375 mm in length, and will accommodate any standard washer rack up to six inches in diameter. Dryer has a 300 watt heater and is suitable for operation on AC or DC. Unit is made of anodized aluminum cylinder mounted on base with "on-off" switch. Vented swivel cover on top of cylinder releases moisture. Unit is approximately 25 inches. It is supplied with cord and plug.

Pipet dryer

(Pipet Dryer is product of Chicago Surgical & Electrical Co., Division of Labline, Inc., Dept. CP, 3070 W. Grand Ave., Chicago 22, Ill. . . . or for more information check 4154 on form opposite last page.)

New form of spectroscopy detailed in bulletin

Technical bulletin of eight pages explains new form of spectroscopy, electron paramagnetic resonance. Diagrams and graphs aid in presentation of information on what is reported to be powerful new tool for basic research in chemistry, physics, and biology.

Technical Information Bulletin, Volume 2, #1 is issued by Instruments Div., Varian Associates, Dept. CP, 611 Hansen Way, Palto Alto, Calif. When inquiring specify 4155 on form opposite last page.

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When inquiring check 4156 opposite last page

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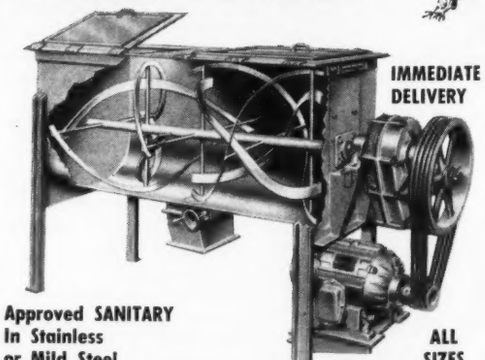
FALCON BLENDER



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When inquiring check 4157 opposite last page

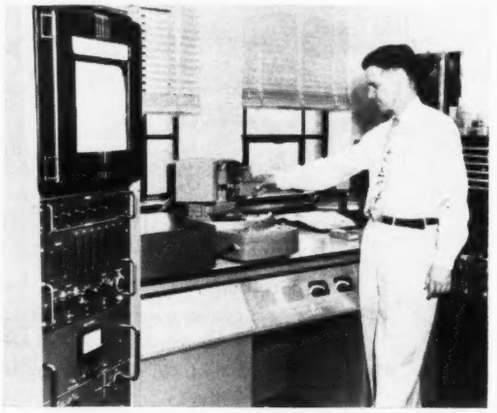
X-ray spectrometer at INCO

cuts alloy analysis time

Non-destructive method allows use of same sample over and over again to check results

Problem: Large number of metal analyses are required daily by research laboratory of International Nickel Company at Bayonne, N.J. Analytical work output per man per day using wet method, in one laboratory section, was only 14.2 determinations. In addition, time-consuming and painstaking procedures required high degree of technical knowledge and manipulative skill for efficient results.

Solution: An x-ray emission spectrometer in laboratory has reduced time required for these analyses. INCO uses spectrometer to analyze element concentrations from 0.1 to 50 percent, through atomic number 13 (aluminum).



X-ray spectrometer increases number of quantitative analyses per day in controlling quality of alloys

Using a strong source of x-rays, emission spectrometer causes sample to emit secondary x-rays. These x-rays have characteristic wave length which allow identification of elements present, both qualitatively and quantitatively.

Emitted x-radiation from sample is directed to an analyzing crystal. Performing function of a three-dimensional defraction grating, crystal permits reading of wave length and consequent identification of element. Gas-flow-type proportional tube measures intensity of radiation. Since emission lines are characteristic, comparison of spectra with standard curves obtained from samples of known analysis indicates percent of each element present.

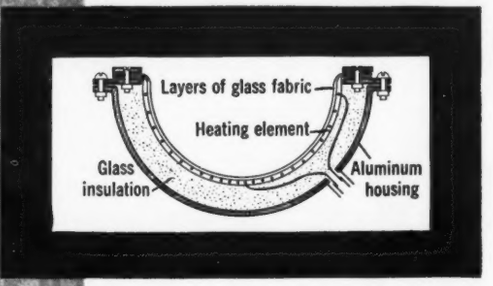
Results: X-ray emission spectrographic analysis has increased number of routine analyses possible at INCO's research laboratory approximately ten times — to an estimated 150 determinations per

GLAS-COL

FLASK HEATING MANTLES ARE **SAFE**

HERE'S WHY:

Glas-Col mantles are designed so that there's no air chamber beneath the flask where explosive vapors can accumulate if the liquid being heated boils over.



As shown in this cross-section sketch, only glass fabric layers, heating elements, glass insulation material (which excludes the air), and the aluminum housing are below the flask being heated.

And here are other advantages offered by Glas-Col Flask Heating Mantles: Heating element resistance wire is closer together at the bottom of the mantle where extra heat is needed to "force over" the highest boiling fractions which remain to the last.

But near the equator of the flask, the resistance wire is spaced farther apart . . . heat input is less . . . the bare flask wall is not heated excessively. This is important for three reasons . . . (1) vapors cannot be superheated, (2) heat-sensitive liquids cannot be damaged by splashing against superheated flask wall, and (3) thermal shock, resulting from relatively cool liquid coming into sudden contact with the flask wall, cannot cause cracks or breakage.

Glas-Col Flask Heating Mantles are not a mere variation of a makeshift hot-plate arrangement. They're designed and built for one thing . . . the safe heating of flasks. For more information, please write: Glas-Col Apparatus Co., Dept. CP, 711 Hulman Street, Terre Haute, Indiana . . . or telephone CRawford 8408.

Glas-Col Flask Heating Mantles have a remarkable safety record . . . extending over 16 years.

No enclosed air chamber here to trap explosive vapors.

GLAS-COL **ELECTRIC HEATING MANTLES**

Trademark Registered U. S. Patent Office

U. S. Patent No. 2,282,078 **U. S. Patent No. 2,231,506**

U. S. Patent No. 2,739,220 **U. S. Patent No. 2,739,221**

SPECIALISTS IN LABORATORY, PILOT PLANT, AND PRODUCTION HEATING PROBLEMS

When inquiring check 4158 opposite last page

man per day. Initial advantage is that results can be checked over and over again since method is non-destructive.

While INCO uses the x-ray emission spectrometer for analyzing high-temperature alloy metals in manufacturing jet engines, instrument has also been used in many widely differing applications. Development of synthetic penicillin is one. Identification of paint pigments is another.

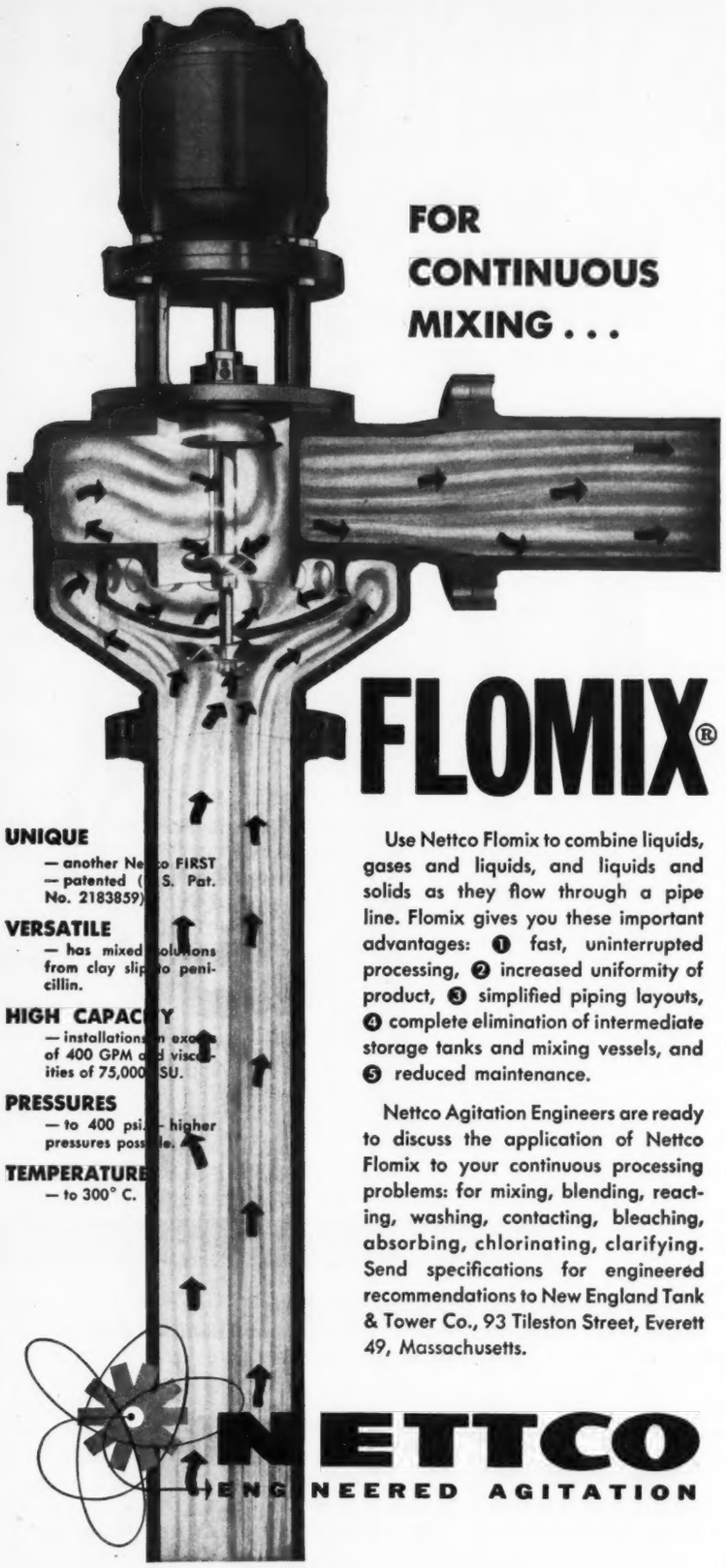
(X-ray emission spectrometer is product of X-ray Department, General Electric Company, Dept. CP, Milwaukee, Wisconsin . . . or for more information check 4160 on form opposite last page.)

Data on electron microscope and components

Bulletin of 12 pages gives data on construction and operation of manufacturer's electron microscope. Principal features are pointed out, and thorough discussion of various components is presented.

"Norelco Electron Microscopes" in issued by Instruments Div., North American Philips Co., Inc., Dept. CP, 750 S. Fulton Ave., Mount Vernon, N.Y. Specify 4161 opposite last page.

"We'll have to transfer Miss Pippin, chief! Her 'gam' radiation is undermining the whole lab!"



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— another Nettco FIRST — patented (U. S. Pat. No. 2183859)

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— has mixed solutions from clay slip to penicillin.

HIGH CAPACITY
— installations in excess of 400 GPM and viscosities of 75,000 SSU.

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— to 400 psi — higher pressures possible.

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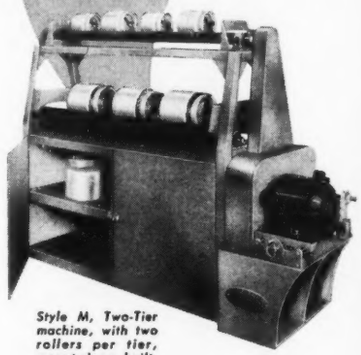
Use Nettco Flomix to combine liquids, gases and liquids, and liquids and solids as they flow through a pipe line. Flomix gives you these important advantages: ❶ fast, uninterrupted processing, ❷ increased uniformity of product, ❸ simplified piping layouts, ❹ complete elimination of intermediate storage tanks and mixing vessels, and ❺ reduced maintenance.

Nettco Agitation Engineers are ready to discuss the application of Nettco Flomix to your continuous processing problems: for mixing, blending, reacting, washing, contacting, bleaching, absorbing, chlorinating, clarifying. Send specifications for engineered recommendations to New England Tank & Tower Co., 93 Tileston Street, Everett 49, Massachusetts.

NETTCO
ENGINEERED AGITATION

When inquiring check 4159 opposite last page

MULTIPLE BATCH GRINDING WITH VERSATILE abbé JAR ROLLING MACHINES



Style M, Two-Tier machine, with two rollers per tier, mounted on built-in storage cabinet.

Multiple batches of similar or different materials can be economically ground, pulverized or mixed simultaneously on a versatile Abbé Jar Rolling Machine.

Jars, bottles or containers of different sizes can be used at one time. Each jar can be removed after its full grinding or mixing cycle has been completed—without stopping the machine.

Modern, rugged Abbé Jar Rolling Machines are available to handle single or parallel rows of jars, and in double or triple tiers for processing as many jars as required. Standard porcelain or steel jars range in size from 1 quart to 6 gallons. Built-in storage cabinets on tiered machines are optional.

Write for NEW Abbé Jar Rolling Machine Catalog 79

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Designers and Manufacturers of Ball, Pebble and Jar Mills • Pulverizers Sifters • Cutters • Mixers

When inquiring check 4162 opposite last page

activated carbon CATALYST SUPPORT

for vinyl chloride, vinyl acetate

Check these features:

1. **Completely suitable for catalyst support.**
2. **Hard activated carbon particles resist dusting.**
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7-WAY ACTION
...for better, faster blending

It lifts... blends... mixes... seven ways, assuring faster, more accurate blending of dry ingredients. Empties completely. Will not grind or reduce particles. Ideal for blending of fertilizers, insecticides, fibrous materials, pharmaceuticals, atomic materials, chemicals, and a wide variety of other ingredients. Can be fitted with internal liquid spray pipe. Gravity intake and discharge with no internal bearings for free-flowing materials.

For details write to:
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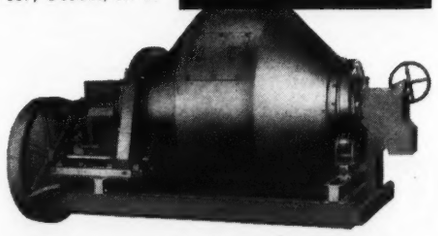

When inquiring check 4164 opposite last page

Find impurities of one part in a billion — in scan of flame spectra . . .

grating spectrometer achieves 16A/mm dispersion at slit

Uses: Scanning spectrometer is designed so that it can be adapted for use as a flame spectrometer.

Features: Optical design results in first-order reciprocal linear dispersion of 16 Angstroms/-mm at exit slit, with a minimum resolution of 0.2 Angstrom units.

Description: Grating spectrometer is capable of detecting impurities to one part per billion when used as a flame instrument. It can also be used in absorption and combustion studies. Linear wave length scanning mechanism requires only a simple mechanical counter as indicator of first order wavelength. Built-in eight-speed motor drive permits variable speed scanning in either direction. Manual drive is also provided. Basic unit measures 18 inches long and weighs about 60 pounds. Accessories are available for electronically recording spectral intensities or absorptions.

(Model 8200 scanning spectrometer is a product of Jarrell-Ash Co., Dept. CP, 26 Farwell St., Newtonville 60, Mass. . . . or for more information check 4165 on form which is located opposite last page.)

Lab apparatus features Teflon plugs

Catalog of 16 pages describes laboratory glassware, listing specifications and prices. Featuring stopcocks with Teflon plugs, equipment includes aspirator bottles, gas collecting tubes, separatory funnels, nitrometers, and manifolds.

Cat 80C100 is issued by Fischer & Porter Co., Dept. CP, 10 Jacksonville Rd., Hatboro, Pa. When inquiring specify 4166 on form which is located opposite last page.

FILTRATION *Engineered** TO MEET CHEMICAL PROCESSING NEEDS

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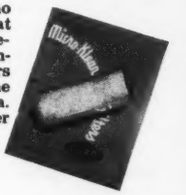
MICRO-KLEAN

- Double Life Replaceable Cartridges
- Higher Flow Rates in Less Space
- Consistent, Uniform Filtration

Cuno now offers *two* distinct Micro-Klean cartridge types: The Cuno Wool Cartridge for 10 to 75 micron filtration and very suitable for a wide range of products and processes . . . and the new Cuno White Cellulose Cartridge offering 5 micron filtration for every application where taste, clarity and purity are of primary importance. Cuno Housings are available for flow rates to 60,000 gallons per hour.

* Because no *one* type of filter is best for every need, Cuno — and *only* Cuno — offers you a truly complete line that includes *several* distinct types of filtration media. And because every filtration system must be specified and engineered to the individual job requirements, Cuno offers a complete application engineering service through the Cuno Field Engineer conveniently located in your area. This specialist is fully qualified to help select the filter type and model exactly right to solve your problems.



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EDGE-TYPE, WIRE-WOUND, FIBER CARTRIDGE and POROUS METAL FILTERS

Filtration Engineers in Principal Cities

When inquiring check 4167 opposite last page

Small infrared spectrophotometer designed for 'bench' . . .

records linearly in transmittance and wavelength from 2 to 16 microns

Uses: As low cost automatic recording infrared spectrophotometer for qualitative and quantitative analysis by organic and analytical chemist.

Features: Instrument's operation is so simple that single button starts a 16-minute scan through entire 2-16 micron spectrum. Instrument is operated with only five controls.

Infrared spectrophotometer fits laboratory desk-top

Description: Scanning speed and other parameters are fixed. Instrument has a flat-bed recorder which shows entire spectrum traced on preprinted file-size charts. Electronic and optic systems are housed, together with recorder, in single console. Instrument is 30 inches long, 25 inches wide, and 14 inches high, and fits a standard laboratory bench or desk. Weight is about 100 pounds.

(IR-6 spectrophotometer is product of Scientific Instruments Division, Beckman Instruments, Inc., Dept. CP, 2500 Fullerton Road, Fullerton, Calif. . . . or for more information check 4168 on form opposite last page.)

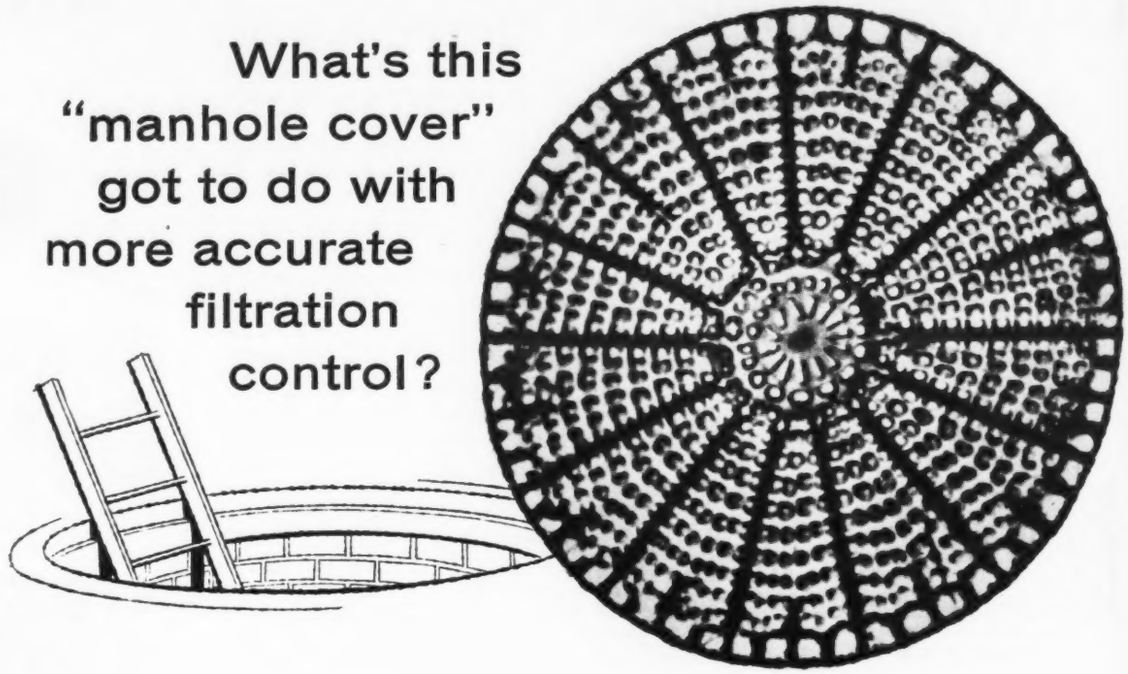
Bibliography of polarographic literature

Of interest to people working in field of analytical chemistry is bibliography of polarographic literature. Reported to be most up-to-date of its kind, bibliography contains almost 7000 entries, and is complete through 1955. Subject index of 48 pages lists over 14,000 references.

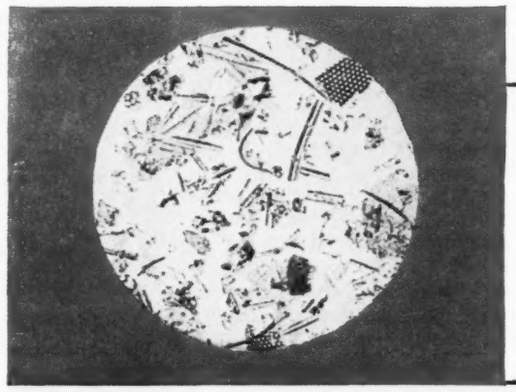
To obtain "Bibliography of Polarographic Literature" remit $5.00 direct to E. H. Sargent & Co., Dept. CP, 4647 W. Foster Ave., Chicago 30, Ill. Specify 4169 on form opposite last page.

THIS "MANHOLE COVER" is really a magnification of *Arachnoidiscus ornatus*, one of the hundreds of different intricate particles that make Celite such an effective filter aid.

What's this "manhole cover" got to do with more accurate filtration control?



It's a particle of CELITE with the



The photomicrograph at left shows the wide variety of particle shapes and sizes in a typical Celite sample. By carefully controlling the proportions of particle sizes, the most complete range of grades is obtained.

Johns-Manville CELITE

Celite's wide range of grades permits precise control of several different filtration operations in the brewing of beer and ale. These include various ruh beer filtrations, wort filtration, final beer polishing and purification of brewing and bottle wash waters.

In industry's modern research laboratories, Celite filtration has proved itself an indispensable tool. Special grades of Celite have been developed that are particularly effective in analytical methods requiring filtration or chromotographic study.

In the manufacture of lubricating oils, Celite filter aids completely remove bleaching clay from the oil itself and also clarify the many additives used by the industry.

-the diatomite filter aid widest range of grades

Need maximum clarification? Use Celite* Filter-Cel. Or does your filtration require the fastest flow rates? Then use Celite 545. In addition, there are 7 more intermediate grades plus many special grades produced for specific applications. Thus, with Celite, you can establish the exact balance of clarity and flow rate that your process requires. No other diatomite gives you such a wide choice of grades.

Celite also gives you other important advantages over competitive filter aids. Its lower wet density provides greater surface coverage per pound. This means substantial savings because six bags of Celite actually do the work of seven bags of other diatomites.

And Celite is uniform. Every pound of Celite comes from the world's largest and purest commercially available diatomite deposit. Every pound is processed and graded at the same plant under the same conditions. Yet, with the large inventory maintained at the plant and Johns-Manville's nationwide network of warehouses, you're assured of fast, sure delivery.

So, if filtration belongs in your processing operations, it will pay you to call in your local J-M Celite engineer. Backed by Johns-Manville's research facilities and years of practical diatomite experience, he can help you with your filtration problems. Call him today or write Johns-Manville, Box 14, New York 16, N. Y. In Canada: Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

Diatomite Filter Aids

JOHNS-MANVILLE JM PRODUCTS

When inquiring check 4170 opposite last page

Evenly distributes heat to flask to minimize 'bumping' . . .

electric flask heater will accommodate several different sizes of containers

Uses: As laboratory heater for flat- and round-bottom flasks, heating to a top temperature of approximately 1000°F.

Features: Flask heater has element placed in such a manner as to minimize the possibility of "bumping". Heat is evenly distributed to flask.

Description: Flask heater uses interchangeable baskets to accommodate flasks of 250, 300, and 500 ml in both round-and flat-bottom models. Flasks are cradled in corrosion-resistant Monel mesh baskets suspended within heating chamber. Heat is transferred to lower half of flask by radiation and by blanket of heated air.

Electrical flask heater is liquid sealed

Double case construction is used. Inner shell, which forms heating chamber, is insulated by air-spaced double wall. It is also liquid sealed to contain accidental spillage. Outer shell is bright stainless steel, perforated for ventilation to prevent it from becoming too hot to handle. Insulated bottom plate protects bench or table top from damage — holding temperature there within 30°F over ambient.

Flask heater is operated with manufacturer's current input controller. It is an "on-off" model with sufficiently rapid cycling period to hold even temperatures. Controller permits stepless control and compensates for line-voltage fluctuations.

Another model of flask heater will accommodate both 1000- and 2000-ml flasks. Top temperature is also approximately 1000°F.

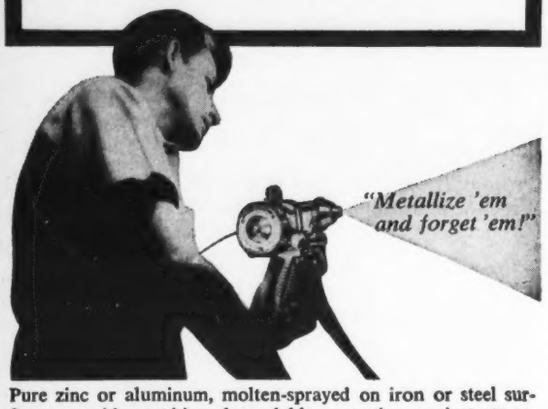
(Temco flask heaters are product of Thermo Electro Mfg. Co., Dept. CP, 476 Huff St., Dubuque, Iowa . . . or for more information check 4171 on form opposite last page.)

Why no subscription price for this magazine?

You might think it odd that you get CHEMICAL PROCESSING without demand of a formal subscription charge. But it really isn't so strange!

See page 197.

Want to forget about rust for 20 years?



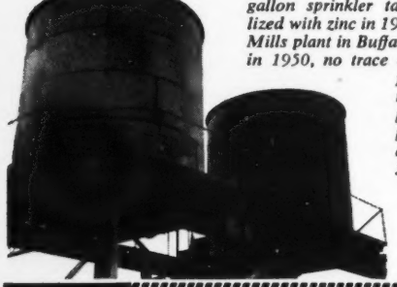
Pure zinc or aluminum, molten-sprayed on iron or steel surfaces, provides positive, dependable protection against atmospheric corrosion for upwards of 20 years without *any* further maintenance.

These unique coatings are *mechanically* bonded to the surface—adhesion is *not* dependent on volatile vehicles or binders. Scaling, crazing, blisters are eliminated. Protection is *positive*. "Metallize 'em and forget 'em!"

Why not find out more about how you can forget about rust on iron and steel structures and equipment—eliminate the nuisance and expense of constant painting and repainting? Write for descriptive Bulletin 62-B—it's free.

the Metco Systems*

—a series of 18 basic engineering specifications developed over 19 years of experience with pure zinc and aluminum coatings on many different types of structures and equipment in a wide range of corrosive conditions. The *Metco Systems* provide for standardization of surface preparation, coating thicknesses and organic aftercoatings for various surface conditions and appearance requirements.



Interiors of these two steel 15,000 gallon sprinkler tanks were metallized with zinc in 1934 at the General Mills plant in Buffalo. Last inspected in 1950, no trace of rust could be found, and zinc remaining is expected to provide proteetion for an additional 15 to 20 years.

Metallizing Engineering Co., Inc.
1143 Prospect Ave., Westbury, L. I., New York • cable: METCO
In Great Britain:
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

DON A. WATSON METALLIZING ENGINEERING CO., INC.
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When inquiring check 4172 opposite last page

Alloy V2B ended galling of valves on tank cars handling nitric acid, formaldehyde, nitrogen solutions, acrylonitrile and a variety of other compounds

Because valves could not be lubricated, galling caused considerable trouble at General American Transportation Corporation. They changed to a beryllium-containing alloy to . . .

eliminate galling, stop valve failures

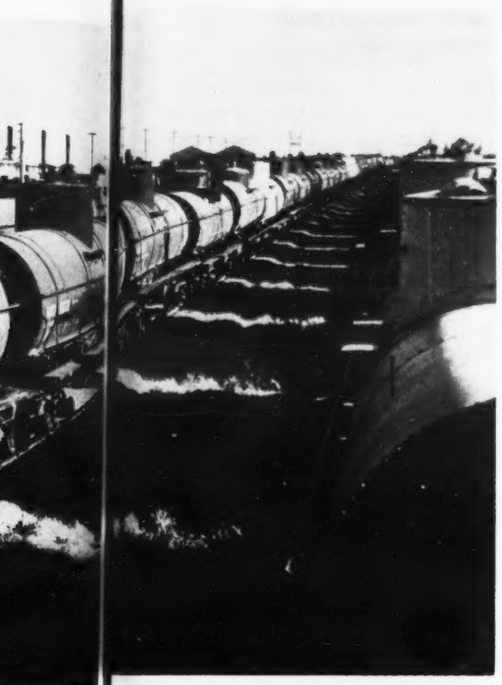
H. E. TIDSWELL, Chief Engineer
Tank Car Div., General American Transportation Corporation
Chicago, Illinois
With **CP Staff**

Problem: Galling knocked out stainless steel plug valves in a short period of time at General American Transportation Corporation. Valves were used as tank car unloading connections and could not be lubricated because of possible product contamination. Stainless alloy used had sufficient corrosion resistance but recurrent galling presented an expensive maintenance problem.

Commodities handled include tall oil, acrylonitrile, butyraldehyde, ethylene glycol, glycerine, fatty acids, acetic acid, acetic anhydride, formaldehyde, toxaphene, phthalic anhydride, polyvinyl acetate, nitrogen fertilizer solution, and nitric acid.

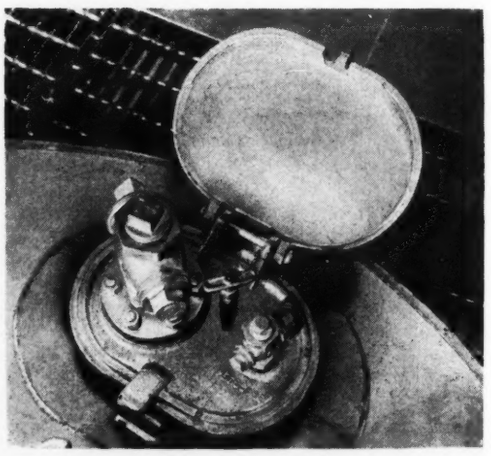
Valves are of two sizes: two-inch units for loading and unloading, and one inch for air hose connections to provide pressure.

Solution: In 1955 GATX began replacing former car valves with units having a plug made from a hardenable 18-8 stainless alloy. Composition includes a small amount of beryllium in addi-



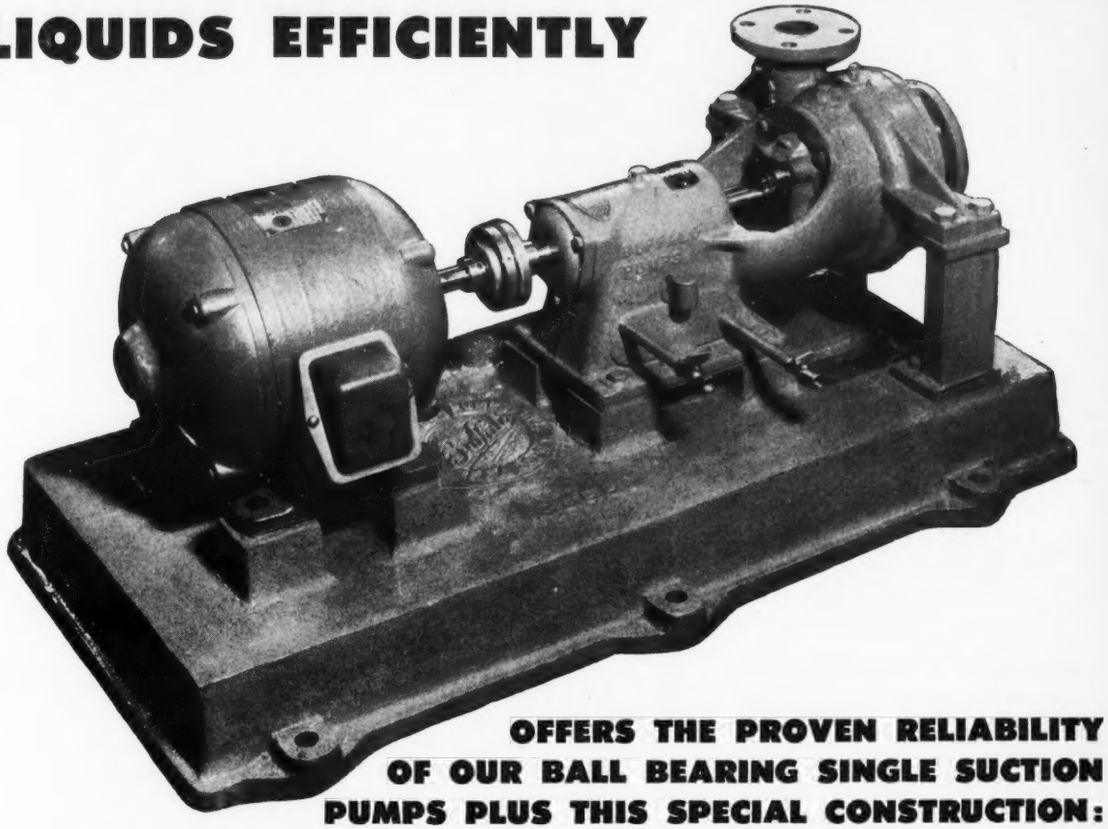
tion to chromium, nickel, molybdenum, copper, silicon, and manganese. Alloy is designated V2B. It is soft enough to be readily machined in quench-annealed condition. After machining it is precipitation-hardened by a low temperature heat treatment to give necessary gall-resistant characteristics.

Turn to page 177



Two-inch plug valve used for loading and unloading (left) and one inch for pressure on a GATX tank car. They are non-galling and corrosion resistant

NEW "BUFFALO" PUMP FOR HANDLING HEAT TRANSFER LIQUIDS EFFICIENTLY



OFFERS THE PROVEN RELIABILITY OF OUR BALL BEARING SINGLE SUCTION PUMPS PLUS THIS SPECIAL CONSTRUCTION:

These "Buffalo" Pumps handle high temperature oil to complete satisfaction. Besides the special features listed at right, it has the high-efficiency "Buffalo" impeller and casing design plus overall durability, strength and accessibility.

If you have a vapor phase heat transfer problem, write today for our Engineering recommendations. "Buffalo" is your assurance of satisfaction wherever liquids are to be handled!

- WATER COOLED bearings and stuffing boxes
- CAST STEEL casings and side plates — full centerline support
- SPECIAL PACKING (mechanical seals if desired)
- Smothering gland
- FLEXIBLE ALL STEEL coupling
- Colmonoy-coated shaft sleeve thru stuffing box

"Buffalo" PUMPS

BUFFALO PUMPS

Division of Buffalo Forge Co.

524 BROADWAY **BUFFALO, N. Y.**

Canada Pumps, Ltd., Kitchener, Ont.

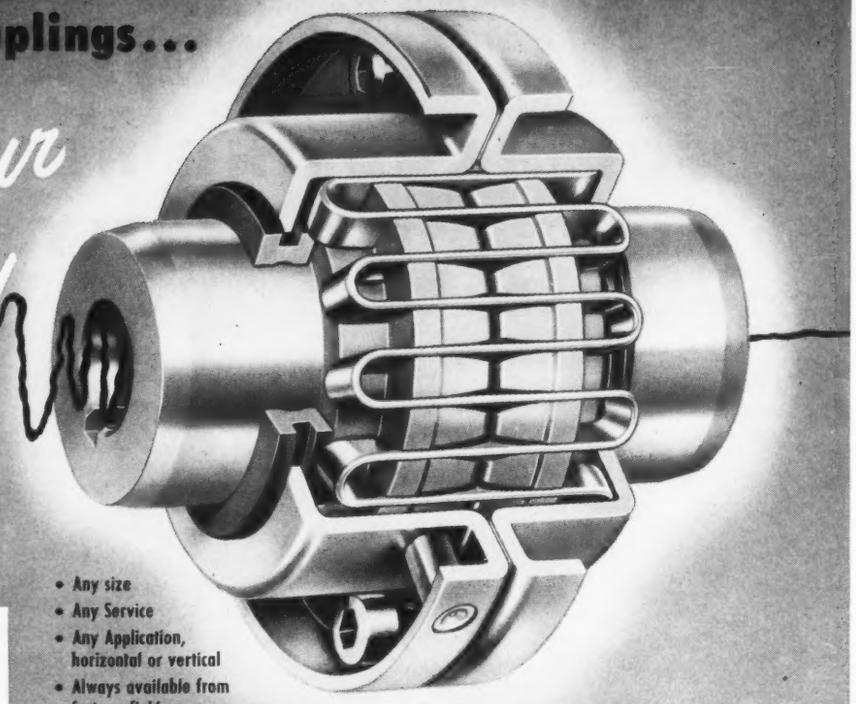
Sales Representatives in all Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

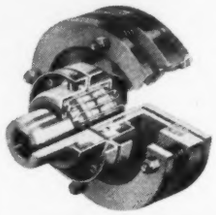
When inquiring check 4173 opposite last page

Falk Steelflex Couplings...

Protect your machinery in 2 ways



- Any size
- Any Service
- Any Application, horizontal or vertical
- Always available from factory, field or distributor stocks

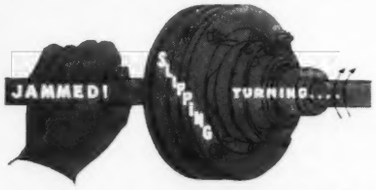


Falk Controlled Torque Couplings prevent damage from overloads

In applications where danger from overloads exists, use the FALK Type FT Controlled Torque Coupling. The Type FT has all the features and advantages of standard FALK Steelflex couplings—and, in addition, has an adjustable friction slip clutch, enabling the operator to set the coupling to slip at any predetermined overload.

This controlled-torque principle not only prevents transmission of dangerous shocks and limits overloads; it eliminates the breaking of shafts caused by jamming of driven equipment.

An outstanding advantage of the Type FT Coupling is that, as soon as the cause of the overload is removed, the entire coupling will rotate and transmit power without replacing parts or repairing coupling.



There's real economy in using Type FT Controlled Torque Couplings. Many users have reported that these couplings paid for themselves the very first time they slipped (under overload) because of the protection against damaged driving or driven machinery!

...cost less per year of service!

You get *double protection* when you connect your driving and driven machinery with a Falk Steelflex Coupling—the all-steel coupling with the exclusive grid-groove design! First, its *torsional resilience* smothers shock and vibration; and second, the Steelflex design prevents damage and lowered efficiency by accommodating shaft misalignment.

Why have increasing numbers of key men in industry standardized on Falk Steelflex Couplings? Their experience has proved that Falk Steelflex Couplings prolong the service life of their machinery... are trouble-free and need minimum maintenance . . . are easy to install, lubricate and disconnect . . . and *cost less per year of service* than ordinary couplings.

One basic Steelflex design—the type F, in its many sizes—is adaptable to more than 90% of all industrial applications. For applications involving danger from overloads, Modified Type FT Controlled Torque couplings (see column at left) are ideally suited. There are numerous other special or dual purpose Steelflex couplings for unusual applications. **Write to Department 247** for engineering bulletin, including selection and dimension tables.

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

FALK

...a good name in industry

MANUFACTURERS OF:

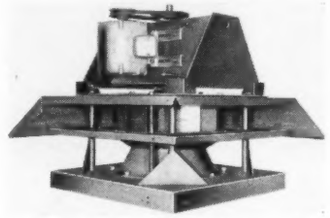
- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

Efficient, quiet ventilator gives unusually high static pressures

Uses: For ventilating applications where ductwork or hoods may impose considerable resistance, as well as for light-duty applications without ductwork.

Features: Unit is stable, highly efficient, and quiet operating. It is designed and constructed to provide unusually high static pressures (up to 2″).

Description: Centrifugal power roof ventilator has four lifting lugs to facilitate handling. Pipe is provided for wiring. Only four bolts are needed to secure unit to roof. Ventilator has low overall



Centrifugal roof ventilator with weather enclosure and two sides of air apron removed

height when installed. Construction advantages include statically and dynamically balanced fan wheel, slide-rail-mounted motor, rubber vibration eliminators, water-tight mounting of inlet cone, and heavy-duty anti-friction bearings. Each unit is adaptable to wide range of motor sizes. Ventilator is built in 10 standard sizes with capacities to 26,400 cfm.

Each unit has complete accessibility as well as an inspection panel. There is venting of motor and drive area from both top and bottom.

(Centrilator is product of Clarage Fan Company, Dept. CP, Kalamazoo, Mich. . . . or for more information check 4174 on convenient Reader Service slip which is located opposite last page.)

For more information on product at left, specify 4175 . . . see information request blank opposite last page.

Beryllium Alloy Valves

Starts on page 174

Water quench, from 2000°F, puts beryllium into solution and keeps in solution carbides detrimental to corrosion resistance. Metal is hardened by holding at 925°F for eight hours followed by furnace cooling. No distortion or harmful carbide precipitation is produced in relatively low-temperature hardening operation.

Chemical Composition Range of V2B

Chromium %	19.0 to 19.50
Nickel %	9.75 to 10.25
Silicon %	2.75 to 3.25
Manganese %	0.50 to 0.75
Copper %	2.0 to 2.25
Molybdenum %	3.0 to 3.50
Beryllium %	0.10 to 0.20
Carbon %	<0.07

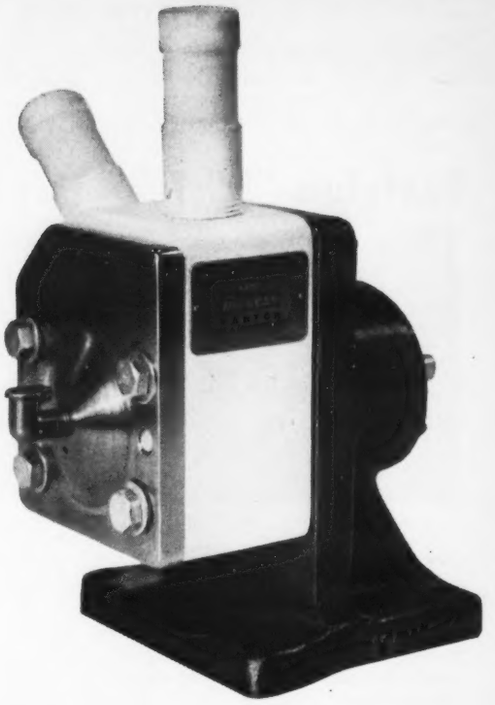
Results: Galling and subsequent valve failure have been eliminated. Since no lubrication is required, product purity is maintained. Alloy successfully withstands erosive and corrosive effects of variety of compounds handled in General American's fleet of tank cars.

(Alloy V2B plug valves are a product of Cooper Alloy Corp., Dept. CP, Hillside, N.J. . . . or for more information check 4176 on form which is located opposite last page.)

"Someone should explain to the new man we don't have to eat everytime a whistle blows."

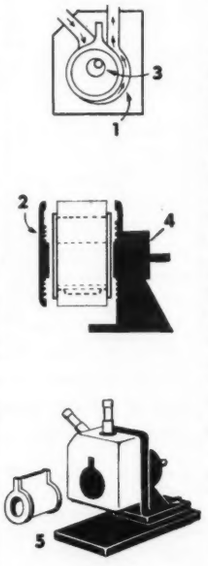
Thanks to J. B. Rabon, Monsanto Chemical Company, Texas City, Texas

NEW!



VANTON'S NEW TEFLON* PUMP!

HOW VANTON DESIGN WORKS



Liquid flows in channel between molded plastic body and synthetic flex-i-liner (1) • No liquid touches metal • Liner flanges secured to plastic body by bolted face plates (2) • Pumping mechanism is rotor mounted on eccentric shaft (3) • At each revolution it pushes liner against body block and sweeps a slug of liquid around the circular track from inlet to outlet • All bearings are outside of fluid area, and located within a protective stainless steel assembly in the event of flex-i-liner failure (4) • Liners are replaced in minutes, with pump in process line, by simply removing face bolts and face plate, slipping old liner out, new one in (5).

No stuffing-box or shaft seals to leak, contaminate, or require maintenance!

Long-term maintenance-free operation even with aqua regia!

Now at last, here's a pump to solve for good your problems of pumping corrosive or abrasive liquids or slurries! HCl, caustics, $TiCl_4$, even fuming HNO_3 and fuming H_2SO_4 (oleum), all yield to the combination of Vanton's unique pump design with *Teflon and Kel-F** elastomer*, the outstanding new fluorocarbons that remain unaffected by even aqua regia!

The Vanton Pump design eliminates stuffing boxes, shaft seals, gaskets, and check valves. Previously available in many other plastics and synthetics, its appearance now in fluorocarbon materials enables it to provide prolonged maintenance-free pumping of almost any corrosive or abrasive substance in commercial production today.

All Vanton pumps are self-priming, high-vacuum, and available in a broad range of capacities from ⅓ to 40 g.p.m. In addition to Teflon, they are obtainable in 7 body and 10 flex-i-liner materials, including polyethylene, Buna N, hypalon, Kel-F, etc.

**TEFLON—Reg. trade-mark of Du Pont for its tetrafluoroethylene resin.*
***KEL-F—Reg. trade-mark of Minnesota Mining & Mfg. Co.*

WRITE FOR NEW 8-PAGE VANTON CATALOG TODAY!
It gives the whole story!

VANTON PUMP and Equipment Corp. • Hillside, N. J.
DIVISION OF COOPER ALLOY CORP.

When inquiring check 4177 opposite last page

Fansteel

Corrosionomics

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A JOURNAL OF USEFUL INFORMATION FOR THE SOLUTION OF CORROSION PROBLEMS

Tantalum "U" Tube Heat Exchangers

*By A. T. Bergstrom**

Since the tube side of shell and tube type heat exchangers is the "tightest" side, tantalum exchangers of this type are usually constructed so that the corrosive liquid being handled passes inside the tantalum tubes rather than around them.

Conventional fixed tube sheet exchangers are limited to tantalum tubes 6 or 8 feet long because of the 2½ to 1 ratio of thermal expansion coefficients of steel and tantalum. Further, examination and cleaning of the outside of the tubes is difficult.

The "U" tube or hairpin type tube bundle consists of tubes bent to a "U" shape with the both ends fixed in one tube sheet, so that with proper manifolding, the liquid enters and leaves the tubes at the same end of the exchanger. The exchanger can be made in a wide range of sizes by varying tube length and diameter, number of tubes, and shell dimensions.

The advantages: (1) elimination of the differential expansion problem, (2) ease of inspection and cleaning of bundle and shell, (3) no internal gaskets, and (4) elimination of one tube sheet and its tantalum protective flange. The disadvantages: (1), difficulty of replacing individual tubes on inside bends and (2) inability to clean mechanically the interior of tubes at the bends. (Tantalum, however, can easily be cleaned with hydrochloric acid.) The advantages, in most instances, obviously outweigh the disadvantages of this type of construction.

The seamless tantalum tubes are thinwall; 0.020" for ¾" OD tubes for 150 psig steam pressure in the shell, and 0.015" for ½" OD tubes for 200 psig steam pressure provide a safety factor of five. The tube bundle is held in a series of segmented steel baffles fastened together with tie rods.

Teflon** grommets support the tubes in the baffles and permit their free movement.

The tubes are rolled into the steel tube sheet through copper ferrules, and after pressure testing, are arc welded to the tantalum tube sheet facing flange. Tantalum lined headers are bolted to the tube sheet, Teflon gaskets being used to provide a tight, leakproof joint.

Free Tantalum Test Kit

A corrosion test kit, available without charge to research technicians, contains both tantalum sheet and wire. Request it on your letterhead.

The above condensation is typical of articles which appear in CORROSIONOMICS, a Fansteel publication. Mail us your name for inclusion on our mailing list.

*Chief Design Engineer, Chemical Equipment Division, Fansteel Metallurgical Corporation

**Registered trade mark, E. I. du Pont de Nemours & Co., Inc.

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For further data on the above, write:

G573A

FANSTEEL METALLURGICAL CORPORATION

CHEMICAL EQUIPMENT DIVISION

NORTH CHICAGO, ILLINOIS, U. S. A.

When inquiring check 4178 opposite last page

Tell about sound control equipment for machinery, air-handling systems

Bulletin of four pages describes and illustrates panels for sound control of heavy machinery noises. Sound trap to aid in solving problems of noise control in air-handling systems is detailed in 20-page data book. Principles of sound trap and its application to specific problems are presented. Specifications, suggestions for selection, and performance data are included.

Form 386 (Machinery) and Form 442 (Air-handling) are issued by Metal Products Div., Koppers Co., Inc., Dept. CP, Baltimore 3, Md. When inquiring simply specify 4179 on form opposite last page.

Gallons	Diam. Inches	Length Feet	Insul. Surface Sq. Ft.
30	18	2	14
66	20	4	28
85	20	5	33
100	24	4	35
120	24	5	41
140	24	6	48
150	30	4	44
180	30	5	52
220	30	6	61
250	30	7	70
295	30	8	78
315	36	6	75
365	36	7	85
420	36	8	95
525	36	10	115
430	42	6	90
500	42	7	101
575	42	8	113
720	42	10	136
865	42	12	159
1000	42	14	182
750	48	8	131
940	48	10	158
1130	48	12	184
1300	48	14	210
1500	48	16	236
1700	48	18	262

Chart tells sq ft of material needed to insulate cylindrical vessels

As an aid to estimating amount of material necessary to insulate cylindrical vessels, manufacturer has developed chart for converting gal quantities into sq ft of surface area. Data apply to cylindrical shell with two heads.

(Copies of chart are available from Armstrong Cork Co., Dept. CP, Lancaster, Pa. . . . or by checking 4180 on form opposite last page.)

VERSATILITY COUNTS IN OUR BUSINESS

The ability to study a customer's specifications; correctly fabricate, ship and erect his order on time is our stock in trade.

Versatility and alertness are watchwords with us because we never know what the next order will bring. Each job is designed to satisfy the customer's own particular requirements. So, if you're thinking of:

- **Pressure Vessels**
- **Stacks**
- **Special Weldments**
- **Other Steel Plate Products**
- **Storage Vessels**
- **Piping**
- **Field Construction**

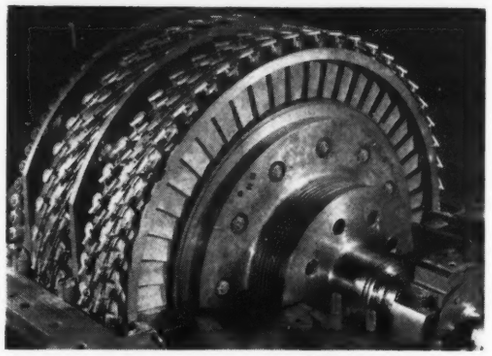
Better Call Us Today!

The YOUNGSTOWN STEEL TANK COMPANY
Youngstown, Ohio

When inquiring check 4181 opposite last page

Adjustable stator blades featured on axial compressor

Arrangement which allows individual rows of stator blades to be adjusted separately or to be tied together to move at one time is feature of axial compressor. Hydraulic master positioner or electric motors through gearing are used to position blades. This feature allows compressor to be



Four-stage axial compressor has adjustable blades on all four stages

used with almost same capacity variation as centrifugal units while still maintaining high efficiency and pressure rises at part load points. Machines are particularly adaptable for large volume applications where capacity variation is necessary, such as chemical plants or oil refineries.

(Axial compressor is manufactured by Allis-Chalmers Mfg. Co., Dept. CP, Milwaukee 1, Wis. Check 4182 opposite last page.)

Chemical inertness, thermal stability with chlorofluorocarbon grease . . .

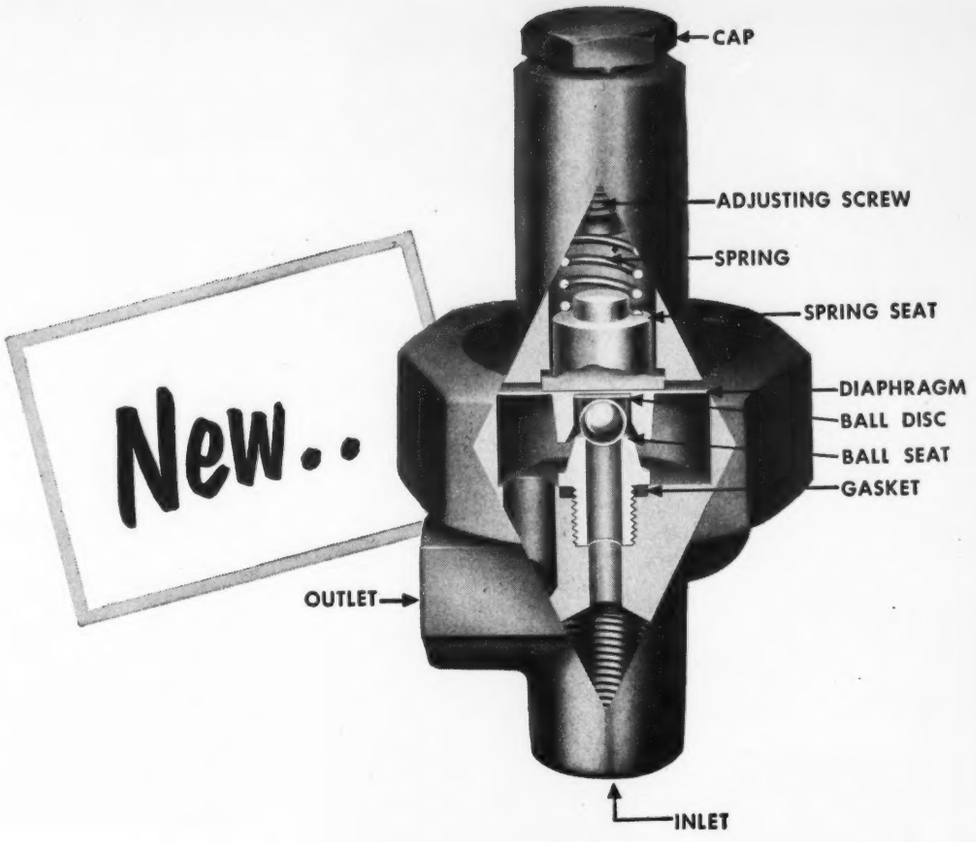
contains no silica, soap, or other non-halogen thickeners

Uses: As lubricant for plug-cocks in oxygen plant.

Features: Material is chemically inert and has high thermal stability.

Description: Material is pure blend of low molecular weight polymers of chlorotrifluoroethylene. It does not contain soap, silica, or other non-halogen thickeners. It has grease-like characteristics in 30° to 275°F temperature range. Above 275°F, it has appearance of clear oil with good lubricating properties up to about 550°F. Below 30°F, grease becomes very heavy.

(Halocarbon grease series 25-10 is available from Halocarbon Products Corp., Dept. CP, 82 Burlews Court, Hackensack, N.J. . . . or for more information check 4183 on form opposite last page.)



Leakproof, Corrosion-Resisting

RELIEF VALVES

and Back Pressure Valves . . .

Guard the accuracy of your Controlled Volume Pumps with these new *leakproof* Milton Roy Relief Valves. Ball checks tightly seal the valves against leakage. In operation, valves are either wide open or securely closed.

These field-proven valves are corrosion resistant. All metal parts that contact the liquid are made of stainless steel, Carpenter 20, or Hastelloy C. Topworks are isolated from the liquid by Teflon or Kel-F diaphragms. Specify Milton Roy Relief Valves for any service at pressures to 1500 psi.

Corrosion-resistant Back Pressure Valves, with Teflon diaphragms, are available for service at pressures to 200 psi. Sizes: ¼", ½", ¾," 1".

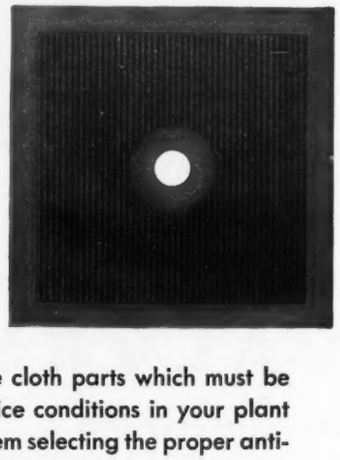
Write for Bulletin 357 for specifications and prices.

MILTON ROY COMPANY, *Manufacturing Engineers,* 1300 East Mermaid Lane, Philadelphia 18, Pa.

Engineering representatives in the United States, Canada, Mexico, Europe, Asia, South America, Africa, Australia.

milton Roy
CHEMICAL FEED SYSTEMS

When inquiring check 4184 opposite last page



Are you using wire cloth or wire cloth parts which must be corrosion resistant? Are the service conditions in your plant really tough? If you have a problem selecting the proper anti-corrosive alloy, Newark Wire Cloth may have the answer.

Available in all corrosion resistant metals, Newark Wire Cloth is accurately woven in a wide range of meshes, ranging from very coarse to extremely fine.

If you have a wire cloth problem involving corrosion, please tell us about it . . . we may have the answer.

NEWARK for ACCURACY

A complete line of woven wire cloth and wire cloth parts in all malleable metals.

Send for Catalog E

Newark Wire Cloth COMPANY

351 VERONA AVENUE • NEWARK 4, NEW JERSEY

When inquiring check 4185 opposite last page

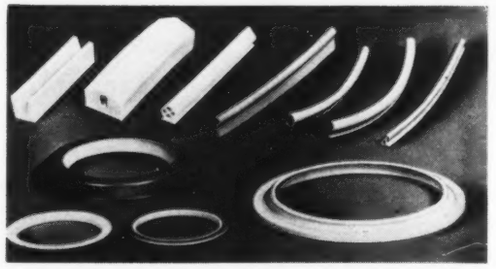
Withstands extreme temperatures, resists oils, chemicals; makes good sealer . . .

silicone rubber packing withstands up to 300°F in continuous use

Uses: As packing material for applications involving ozone, high temperatures, and solvents.

Features: Material has excellent resistance to aging, sunlight, and ozone, as well as to oils and chemicals at high temperatures. It can withstand, indefinitely, continuous temperatures up to 300°F, and remains flexible at temperatures as low as −70°F.

Description: Company's silicone products include diaphragms, gasketing, oil seals, rings, and valve stem packing. Material is also available in



Sunlight-, ozone-, and age-resistant silicone rubber is available in various forms, regular and sponge

sponge, and in molded, extruded, die-cut, and metal-bonded shapes. Sponge material comes in sheet thicknesses from 1/16 through ½", and extruded round cross-section size from ¼ to ¾" diameter.

(Silicone rubber packing materials are available from The Garlock Packing Co., Dept. CP, 402 Main St., Palmyra, N.Y. . . . or for more information check 4186 on form opposite last page.)

Direct-driven rotor-impeller is only moving part on pump . . .

front and rear bearing are only two friction points; pumping chamber can be totally enclosed

Uses: For routine pumping and particularly for applications where leakage would be dangerous, unsightly, or cause slippery floor conditions; ideal for pumping toxic, flammable, noxious, radioactively "hot", volatile, and other hazardous liquids.

Features: Direct magnetically-driven rotor-impeller is only moving part. Only two friction points are front and rear bearings. Pumped fluid lubricates mechanism and dissipates heat. Pump-

CLEAN* SEPARATION

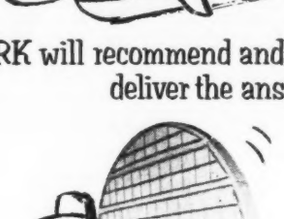
*99.9% plus **with**

YORKMESH DEMISTERS

(MIST ELIMINATORS, ENTRAINMENT SEPARATORS)

YOU present your problems...

YORK will recommend and deliver the answer!



Why not take advantage of our vast experience in improving the performance of process equipment. In the past 10 years, the outstanding success of thousands of installations is proof of the superiority of YORKMESH DEMISTERS for entrainment control.

Yorkmesh Demisters are used to improve product quality, to avoid losses, and to increase thruput capacity. Our engineers will give careful consideration to the information you submit and will recommend the best answer to your problem.

YORKMESH DEMISTERS

improve the performance of:

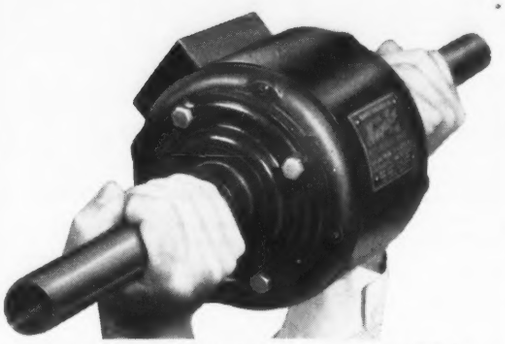
Vacuum Towers • Distillation Equipment • Gas Absorbers • Scrubbers • Evaporators • Knock-out Drums • Steam Drums

YORK

OTTO H. YORK CO., INC.

6 CENTRAL AVE. • WEST ORANGE, N. J.

When inquiring check 4187 opposite last page



Ideal for pumping hazardous liquids, centrifugal pump has only one moving part — magnetically driven rotor-impeller

ing chamber can be totally enclosed; no seal, stuffing box, or lubrication ports to leak.

Description: Rotor-impeller of centrifugal pump operates within stainless-steel sleeve. Sleeve isolates pumped fluid from stator physically, but not magnetically, acting like air gap in an ordinary electrical motor. Effectively it isn't there and causes no measurable interference with magnetic flux. To provide pumping action, electrically unused core of rotor is replaced by an efficient impeller. Rotating on fixed stainless steel shaft, it is suspended between and seated in intake manifold and diffuser. Bearings, end bells, flanges, gaskets, O-rings, and relay complete pump. Pump sizes of ¾, 1, 1¼, 1½, and 2" are available. Capacities up to approximately 48 gpm are produced with 10' head in largest size.

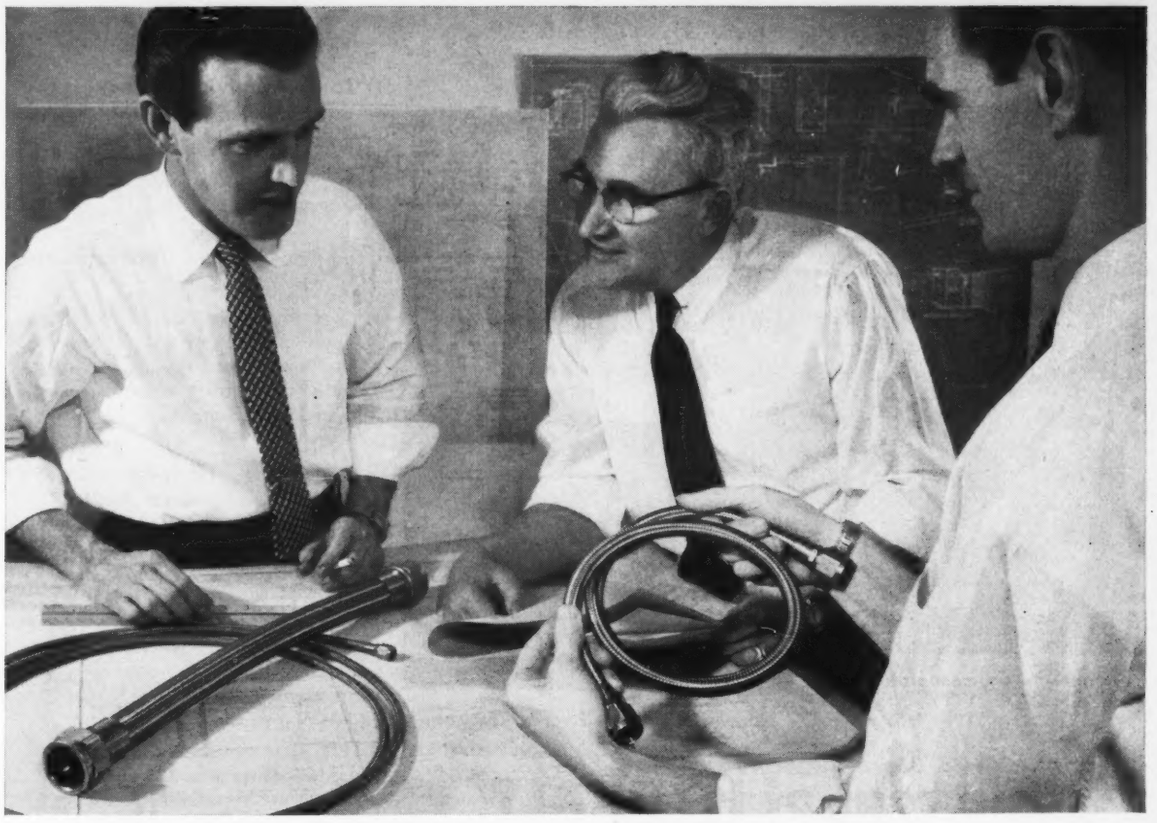
(Magnaflow pump is product of The Corley Co., Inc., Dept. CP, 103 E. Main St., Plainville, Conn. Check 4187A on form opposite last page.)

Data on non-lubricated valves for wide range of operations

Non-lubricated, full-opening disc valves suitable for wide range of applications are described and illustrated in 20-page bulletin. Cross-section photographs show valve construction, and tables list dimensions. Parts lists, pressure drop graphs, and operation data are included.

Bul 1256 is issued by Okadee Company, Dept. CP, 332 S. Michigan Ave., Chicago 4, Ill. Specify 4188 on form opposite last page.

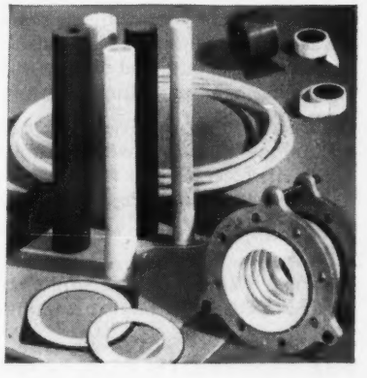
This month's Processing and Engineering Data Section, dealing with chemical materials, starts on page 216



Corrosive fluids won't affect R/M FLEXIBLE THIN-WALL Teflon* HOSE

If piping corrosive fluids is your problem, look to R/M Flexible Thin-Wall "Teflon" Hose to provide an easy solution. Impervious to all industrial acids, caustics and solvents, this hose is non-contaminating and nonabsorbent. It will not harbor bacteria. It is relatively impermeable to most chemicals. It is capable of continuous service at 400°F —and keeps its toughness and flexibility at temperatures as low as −100°F.

Standard R/M Flexible Thin-Wall "Teflon" Hose is supplied in two forms: stainless steel wire braided or rubber covered. It is produced in a wide range of inside diameters and wall thicknesses. Write us for Bulletin 6700, which gives complete information, or for assistance in the solution to any hose problem.



Raybestos-Manhattan is a pioneer in the application of "Teflon." Other R/M "Teflon" products for the chemical industry include machined parts; rods, sheets, tubes and tape; centerless ground rods held to very close tolerances; stress-relieved molded tubes and rods; gaskets, expansion joints and flexible couplings; bondable tape and sheets for linings; and Raylon (R/M trade name for mechanical grade "Teflon"), which has many characteristics of virgin "Teflon." For complete details, call or write R/M.

*A Du Pont trademark

R/M

RAYBESTOS-MANHATTAN, INC.

PLASTIC PRODUCTS DIVISION, MANHEIM, PA.

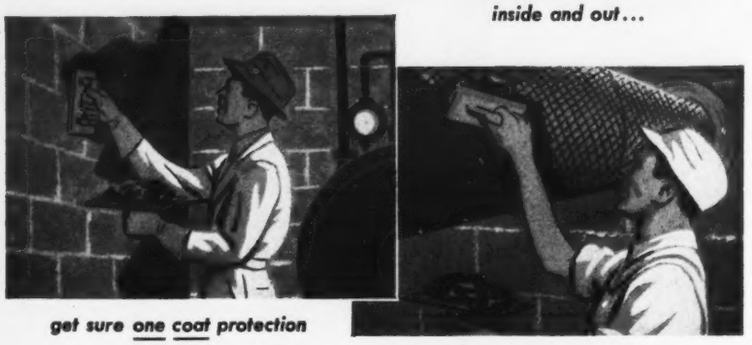
FACTORIES: Manheim, Pa.; Bridgeport, Conn.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC., Engineered Plastics • Asbestos Textiles • Mechanical Packings • Industrial Rubber • Sintered Metal Products • Rubber Covered Equipment
Abrasive and Diamond Wheels • Brake Linings • Brake Blocks • Clutch Facings • Laundry Pads and Covers • Industrial Adhesives • Bowling Balls

When inquiring check 4189 opposite last page

All around the plant...

inside and out...



get sure one coat protection

with Flintkote Hydralt Coatings

One coat of HYDRALT® gives long lasting protection

...add one coat of* DECORALT *for protection plus color

Yes, with a *single application* of Flintkote HYDRALT*, you can increase the life of your insulating materials, metals and masonry. Inside your plant and out. And do it with a big saving in time and money.

HYDRALT Protective Coatings are unique asphalt base emulsions *... reinforced within themselves* to offset the damaging effects of weather, moisture, smoke and fumes.

You can expect protection over MANY YEARS without re-coating.

These coatings really stand up! They won't alligator, crack or craze under exposure. Won't soften or flow under heat. Won't sag or peel off.

If you'd like your protection finished in color . . . add a coat of Flintkote Decoralt*. It's a specially compounded latex seal coating that's available in several good-looking colors.

Ask for full information about Flintkote's spray, brush or trowel applied protective coatings. Or look us up in Sweet's.

THE FLINTKOTE COMPANY, Industrial Products Division,
30 Rockefeller Plaza, New York 20, N. Y.
Boston • Chicago Heights • Detroit
Los Angeles • New Orleans • Philadelphia
In Toronto, Ontario: The Flintkote Company of Canada, Ltd.
In London, England: Industrial Asphalts Company, Ltd.
**A trademark of The Flintkote Company*

FLINTKOTE INDUSTRIAL PRODUCTS

FLINTKOTE

When inquiring check 4190 opposite last page

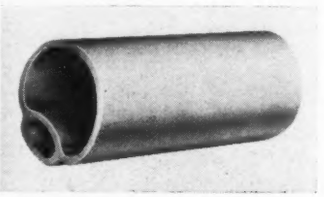
Low cost, high efficiency of steam-traced piping with new design . . .

increases transfer of heat internally, cuts loss externally

Uses: For transfer of materials that require heating.

Features: Design permits lower costs and higher efficiency by increasing transfer of heat internally and cutting heat-loss of external radiation.

Description: New design of extruded aluminum pipe with integral steam passage resulted in one-piece steam-traced pipe with



New design in method of heating product pipe lines lowers costs and increases efficiency

cross-section matching standard pipe sizes. Pipe is available in nominal sizes of 1½, 2, 3, and 4".

(Unitrace is product of Aluminum Company of America, Dept. CP, 790 Alcoa Bldg., Pittsburgh 19, Pa. . . . or for more information check 4191 on the convenient Reader Service slip which is located opposite last page.)

Story of glass related in colorful brochure

Manufacturing methods, applications, and history of glass are explained and colorfully illustrated in 68-page brochure. Charts, drawings, and 130 photographs help tell story of glass — what it is, how it is made, and how it is used.

"This Is Glass" is issued by Corning Glass Works, Dept. CP, Corning, N.Y. When inquiring specify 4192 on the convenient Reader Service slip which is located opposite last page.

this NO-COST TEST OFFER
has CONVINCED thousands
... send for YOUR FREE
"TEST CAN" of C-5 "hi-temp"
ANTI-SEIZE THREAD COMPOUND!
FEL-PRO
C-5
"HI-TEMP"
THREAD COMPOUND
For chemical plant uses, on all studs and bolts exposed to temperatures up to 1800°F. such as on compressor head assemblies, hot pump studs, autoclaves, reactor flange studs, heaters, heat exchangers, "cat" crackers, stainless steel assembly.
Try C-5 and see why leading refineries, manufacturers and power producers have made it part of their regular preventative maintenance program.
fel-pro C5 "HIGH-TEMP"
✓ Ends Seizing and Galling even up to 1800°F.
✓ Reduces Wrench Torque
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✓ Permits Repeated Re-use
✓ Speeds Assembly and Disassembly
✓ Protects Stainless Steel at all Temperatures
1614-C
ANTI-SEIZE THREAD COMPOUND
C-5's exclusive colloidal copper formula separates mating metal threads and surfaces with cushioning, protective copper plating. C-5 prevents galvanic action and eliminates pitting even when dissimilar metals join. On mating metal surfaces, C-5 saves gaskets and countless man hours.
WRITE TODAY... For Your FREE Test Sample Can of C-5.
FELT PRODUCTS MFG. CO.
1515 Carroll Ave., Chicago 7, Illinois

When inquiring check 4193 opposite last page

"What's A New Solution"?

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved. Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

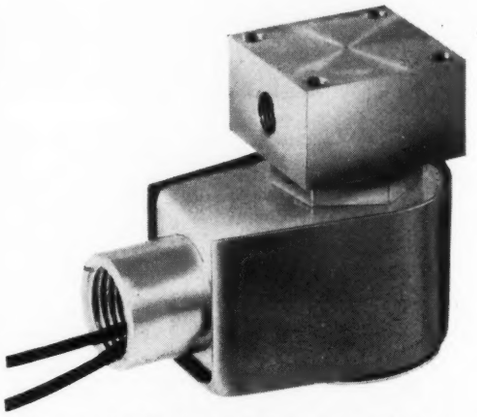
Gives reliable control of liquid CO_2 for cooling applications . . .

direct or remote injection solenoid valves mount in any position without affecting operation

Uses: Designed to automatically control discharge of liquid CO_2 in low temperature tumbling barrels, environmental test chambers, and other cooling applications where constant temperature control is essential.

Features: Valve has only two operating parts, and water-tight molded coils.

Description: Valve has stainless steel, angle-type bar stock body and Teflon disc for tight



Two-way solenoid valve has Teflon disc for tight shut-off on pressures to 1000 psi

shut-off on pressures to 1000 psi. All parts in contact with fluid are either stainless steel or Teflon. Valves mount in any position without affecting operation. Direct-injection and remote-injection types of construction are available.

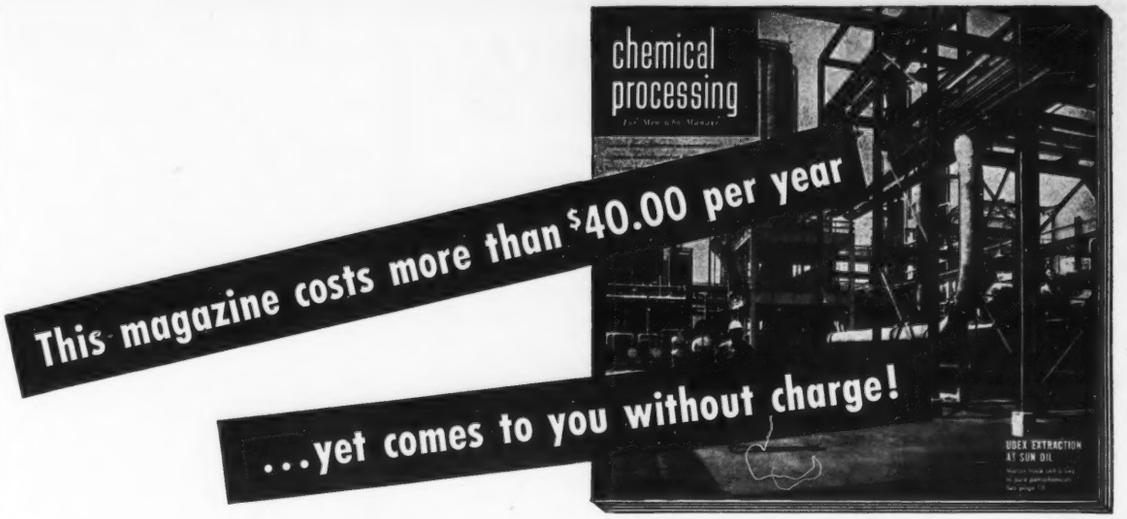
(Two-way shut-off solenoid valve is product of Automatic Switch Co., Dept. CP, 391 Lakeside Ave., Orange, N.J. . . . or for more information check 4194 on the convenient Reader Service slip opposite last page.)

You receive CHEMICAL PROCESSING . . . without subscription charge . . .

. . . because you are responsible for some phase of processing in your company.

Why does this circulation policy make this magazine more useful to you?

See page 197



Why? Maybe, like many others, you've wondered why CHEMICAL PROCESSING comes to you *without charge* — while, perhaps, you pay a subscription price for other business magazines.

Maybe you've thought publishers *make money* when they sell you a $3.00 or a $5.00 subscription.

No—publishers lose money . . . yes, most business magazines lose money when they sell a subscription — not only because the magazine costs more to produce than the subscription price brings in — but also because the cost of making such sales exceeds the income for $3.00 or $5.00 subscriptions.

Advertisers pay the bills — You see, it's the money that comes from advertising that keeps the business magazine publisher in business. So, logically, such advertisers *demand* best possible coverage of folks like you—the important key men who exercise buying power.

So—CHEMICAL PROCESSING "hand-picks" best readers . . . and sends the magazine to these key folks, without charge.

For you simply can't get maximum coverage of these important folks by trying to sell subscriptions. These men, limited in numbers, are scattered all over the U.S.A.: travel and/or direct mail cost money; a large share "forget to renew" each year; and, no matter how much time, money and pressure you put on them, there are always some important men who will never buy.

CHEMICAL PROCESSING gets best circulation . . . So, as you can see, to get the best, most effective circulation coverage, the best way is to "hand-pick" the right readers, then send the magazine to them. This gives value to advertisers which can't be gotten in any other way.

That's why . . . CHEMICAL PROCESSING "hand-picks" only qualified readers . . . Men Who Manage chemical processing plants . . . presidents, partners, plant managers, foremen, engineers, chemists, directors of research, etc. Then the editors make the magazine so interesting, so valuable, these folks want to read it.*

That's why CHEMICAL PROCESSING spends many thousands of dollars on each issue — to give you this valuable service costing more than $40.00 per year, per reader. That's why CHEMICAL PROCESSING comes to you without charge—*you are an important reader in the chemical field.*

**Every issue proves this qualified readership . . . by unequalled response from these key readers. May we show you the evidence?*

Chemical Processing

published by Putman Publishing Company

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Selected Assignments

- **Process Design Engineers**
- **Research & Development Engineers**
- **Project Engineers**
- **Estimating & Economic Evaluation Engineers**
- **Mechanical Engineers**
- **Design Engineers**
- **Construction Engineers**
- **Field Operations Manager**
- **Operating Superintendent**
- **Manufacturing & Process Engineer**
- **Sales Engineers**

AIR PRODUCTS, INC., situated in Eastern Pennsylvania at the foothills of the lovely Pocono Mountains, with ready access to three fine universities as well as other cultural and recreational facilities, offers you . . .

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2. **Company paid advanced educational program.**
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At AIR PRODUCTS you will work with recognized leaders in the industry.

Send resume in confidence to Mr. E. J. STROBEL

Air Products
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P.O. Box 538 **Allentown, Pa.**

When inquiring check 4195 opposite last page

Reactor at Argonne supplies its own electricity from atomic power. Dome is top of 119'-high reactor housing. It is essentially gas tight

To prevent escape to atmosphere of steam water, dust, or gases that might contain radioactivity . . .

500,000-cu ft, gas-tight tank houses reactor at Argonne

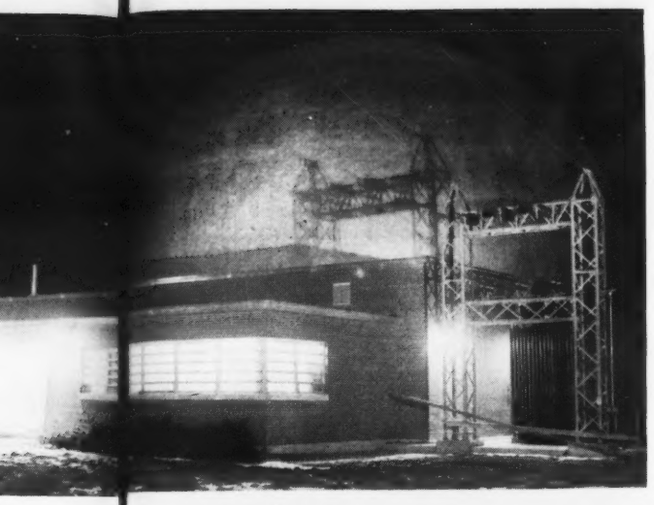
Problem: Housing for Experimental Boiling Water Reactor at Argonne National Laboratory, Lemont, Illinois,—the first full-scale nuclear power plant in the western hemisphere—had to be essentially gas tight. No steam, water, dust, or gases which might contain radioactivity could escape to atmosphere. Economics and space considerations indicated a design pressure of 15 psig as optimum for accidental pressurization.

Vessel would enclose 500,000 cu ft of air. Final dimensions: Diameter 80 ft, overall height 119 ft with hemiellipsoidal bottom head and hemispherical top head. Approximately one half of the vessel would be below ground. Specifications called for a maximum leakage allowance of 500 cu ft per 24 hours under full 15 psig pressure.

Since this would be one of the first structures of this type and size fabricated, construction company could rely on prior knowledge only for recommended construction methods. Special testing procedures had to be developed to demonstrate compliance with pressure specifications.

Solution: Plates were shaped and formed to fit precise location in structure. Engineers made 160 working drawings to translate design of structure into component plate work for containment vessel. Height of cylindrical portion and volume of top and bottom heads were selected to contain a maximum forseeable pressurization in case of steam and gas release. Plate thickness conformed to ASME Pressure Vessel Code: Bottom and straight side $\frac{5}{8}$" thick, top $\frac{3}{8}$" thick. Weld seams were spot-tested by radiographs, particularly at weld junctures where improper fusion was most likely to occur.

Since purpose of containment vessel is to keep any possibly radioactive steam or air



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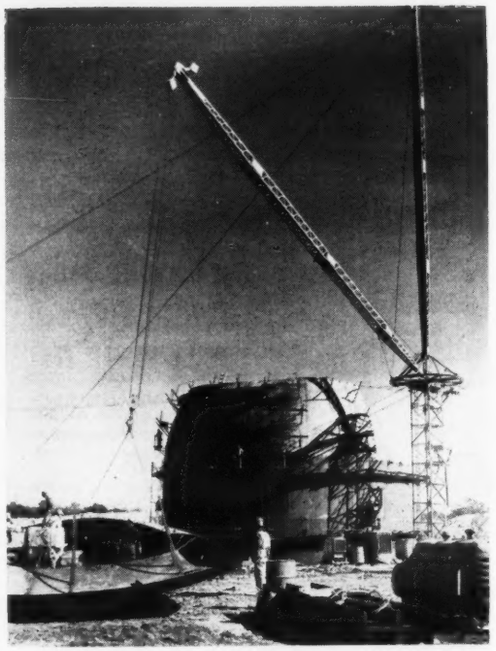

Upper portion of 500,000 cu ft containment vessel nears completion. All-welded vessel more than met specifications for gas tightness

leakage from escaping to atmosphere, it was required to prove that whole vessel was gas-tight within the specification limits. Measurements of maintained volume, under pressure, were taken with appropriate corrections made for changes in temperature, wind, rain, and humidity variations, and rise and fall of barometric pressure.

When shell was finished it was pressurized to 10 psig. All welds were painted with a thick soap

Turn to page 191

There's more to filtration than

$$\frac{dV}{Ad\theta} = \frac{\mathcal{E}c \times \Delta p}{(aW/A + Rm)\mu}$$

Photo courtesy T. Shriver & Co.

Filtrate volume, pressure drop, cake weight, viscosity—these are a few of the variables in this basic equation for cake filtration. None of these factors can be ignored, any more than the many variables can be overlooked in the selection of a filter fabric. Fiber, yarn number, crimp, twist, weave, porosity and other qualities must be calculated and considered before a filter fabric can be selected for a specific filtration job. That's why you should make fullest possible use of the people who engineer and distribute filter fabrics. If you have a particularly knotty filtration problem, call us. A wide range of cotton and synthetic fabrics in many constructions is available for your requirements. Make use of Wellington Sears' century of experience in industrial fabrics, and the practical knowledge of our specialist-distributors. We are all ready to serve you. For free copy of illustrated booklet, "Filter Fabric Facts," write Dept. M-6.

Wellington Sears

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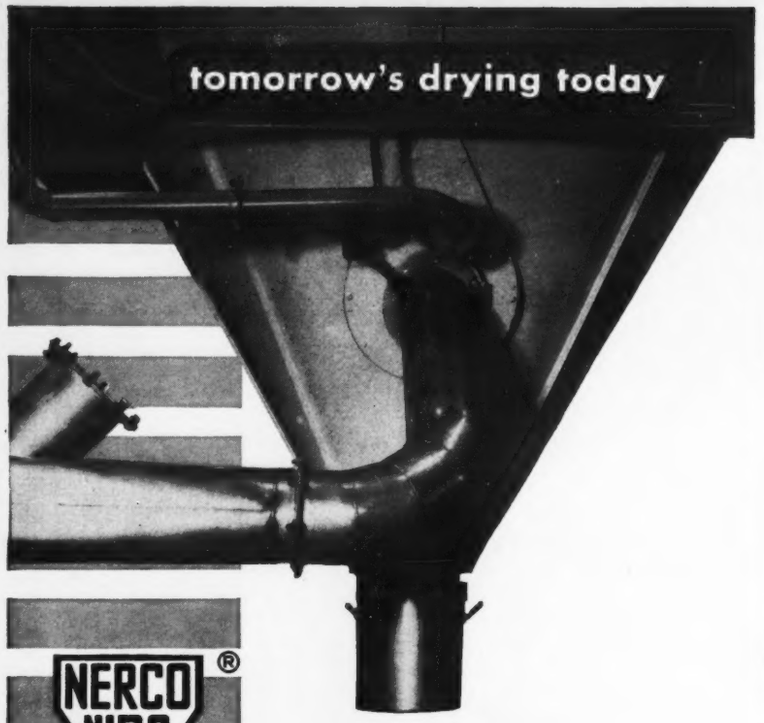


NERCO NIRO®

. . . spray dryers

Nerco-Niro, the advanced spray drying system, sets the pace in design and drying performance for today's—and tomorrow's—processing requirements. You can dry more, in less time, with closer product control, in a Nerco-Niro system.

No hot metal surfaces to injure heat-sensitive materials.

No scrubbers or scrapers necessary—product is free-flowing.

Uniform bulk density and particle size.

Hourly power consumption per ton of product as low as 20 H. P.

Write for Bulletin No. 226

Nichols Engineering & Research Corp.
Nerco-Niro Spray Dryer Division
70 PINE ST., NEW YORK 5, N. Y.
1637 N. Illinois St., Indianapolis 2, Ind.
1477 Sherbrooke St. W., Montreal 25, Canada

When inquiring check 4197 opposite last page

Friction-free benefits of ceramic materials, strength of steel

facing material now available on company's seals

Uses: As shaft seal for use in sealing all chemicals with exception of hot, strong caustics and some fluorine compounds.

Features: Material combines friction-free benefits of ceramic with strength and resistance of steel alloys. Highly resistant to corrosion, it has very high melting point.

Description: Facing material on mechanical seal is patented Rokide process coating, developed by the Norton Company of Worcester, Mass.

(Facing Material #55 is available from Durametallic Corp., Dept. CP, Kalamazoo, Mich. . . . or for more information check 4198 on the convenient Reader Service slip which is located opposite last page.)

Pump for molten sulfur has heated discharge . . .

jacketing keeps sulfur at elevated temperature

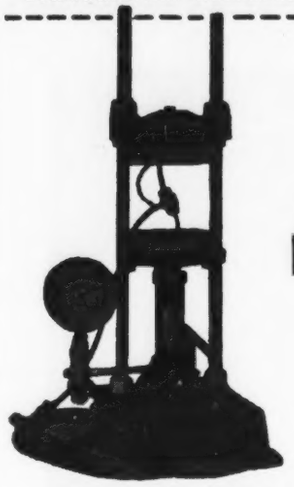
Uses: Unit developed for handling molten sulfur or other materials which must be held at elevated temperature.

Features: Steam-heating of discharge line prevents congealing or solidification.

Description: Pump is of wet pit type. Several mounting arrangements for vertical-shaft electric motor are available. Impeller and housing are of abrasion-resistant alloy. Bearings are designed and placed to resist heat.

(Hot sulfur pump is product of Nagle Pumps, Inc., Dept. CP, 1247 Center Ave., Chicago Heights, Ill. . . . or for more information about manufacturer's product reader may simply check 4199 on form which is located opposite last page.)

Standard for Research and Development



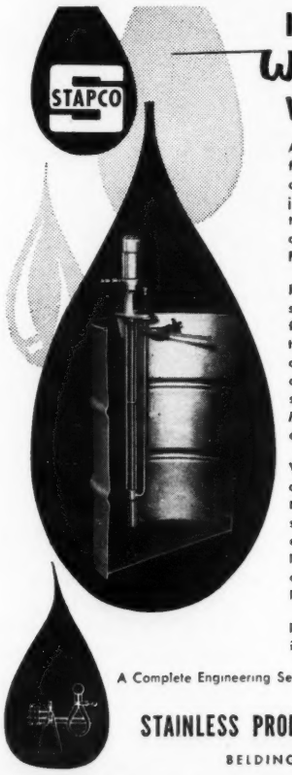
the CARVER LABORATORY PRESS

. . . wherever Pressing is required.

Accurately controlled pressures to 20,000 lbs.; 6-inch gauge mounted on base. Carver Standard Accessories include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment. Available from stock. Write for catalog.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
52 RIVER ROAD, SUMMIT, N.J.

When inquiring check 4200 opposite last page



IF IT WILL FLOW Will-Flow WILL PUMP IT!

Adhesives, inks, chemicals, foods and drugs of semi-solid or heavy liquid consistency are just a few materials efficiently transferred from one point to another through lines by Will-Flow Systems.

Pumped directly from drum-sized containers, materials are fully protected from contamination by Will-Flow. All parts in contact with the product are constructed of 18-8 stainless steel or similar materials. Models available to handle various capacities.

Will-Flow is fully automatic in operation and delivers materials to points of use at uniform pressures without spillage, wastage, or loss through evaporation. Improves plant housekeeping conditions and lowers material handling costs.

If it will flow, Will-Flow will pump it! Write for full information.

A Complete Engineering Service

STAINLESS PRODUCTS CORPORATION
BELDING, MICHIGAN

When inquiring check 4201 opposite last page

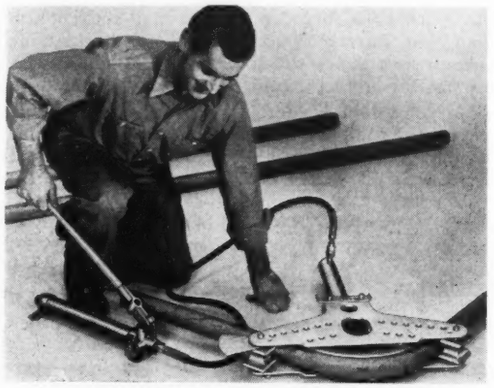
Pipe bending made easy with hydraulic tool . . .

removal top plate permits easy setting of shoes and positioning of pipe

Uses: For bending up to 2" diam pipe.

Features: Removable top plate permits easy setting of shoes and positioning of pipe for bending. Bends up to 90° can be made in one setting of pipe and with one stroke of ram.

Description: Bending frame, swivel and bending shoes are made of rigid, lightweight aluminum for portability, easy assembly, and maneuverability.



Pipe can be inserted from top and bending job accomplished without loss of time in congested areas

Bender will work in any position; on floor, table, or overhead on existing runs. "Optik angle gauge" permits operator to have visual control of progress of the bend with every pump stroke.

Six cast aluminum bending shoes handle ½ to 2" diameter pipe or conduit. Shoes are set on plunger and lock pin dropped into place. Remote-controlled hydraulic power unit gives bender complete portability, and can be used separately as maintenance jack.

(Model S-130 "One Set" hydraulic pipe bender is product of Blackhawk Mfg. Co., Dept. CP, 5325 W. Rogers St., Milwaukee 46, Wis. Check 4202 on form opposite last page.)

Fabrics coated with silicone rubber, nylon resin listed

Properties, applications, base fabrics, and coatings of silicone rubber, and nylon resin coated fabrics are briefly discussed in four-page bulletin. Over 30 standard fabric constructions are listed.

Bul F-56 is issued by The Connecticut Hard Rubber Co., Dept. CP, 407 East St., New Haven 9, Conn. Specify 4203 opposite last page.

November, 1912 NATIONAL PETROLEUM NEWS 33

STEEL TANKS and PLATE WORK

"GRAVER TANKS"

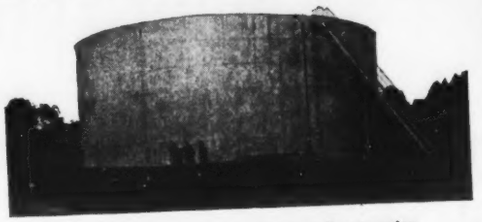
NEED NO INTRODUCTION TO THE

"Independent Dealer"

AS THEY HAVE BEEN

"Favorably Known"

EVER SINCE THE DISCOVERY OF OIL



Large Oil Storage Tank—All Steel Construction

We are carrying in stock, for prompt … of from 12,000 to 20,000 gallons ca… y. Our prices will interest you and our const… stant approval.

WE MAINTAIN AND OPERATE OU…

Large Field Tanks …

A SPECIALT…

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DENVER, COLO., 1718 California St. LOS ANGELES, CAL., 312 Security Bldg. SALT LA… 623 Newhous…

Long Before There Was an API Code . . .

. . . cone roof tanks built by Graver always met the exacting quality standards rigidly insisted upon by William Graver, Sr., from the time he first began building tanks in 1857.

Over the years, many of the improvements in cone roof tank design and in fabrication and erection techniques were originated by Graver to meet the demand for larger tanks in a variety of shapes.

As Graver begins its second century, traditional Graver quality standards continue to be preferred by buyers of cone roof tanks seeking long life and trouble-free maintenance.

1857-1957 GRAVER Our 100th Year

GRAVER TANK & MFG. CO., INC.

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Building for the Future on a Century of Craftsmanship in Steels and Alloys

When inquiring check 4204 opposite last page

Meet the "Little Brother"

. . . he's New in the Warren family

Across the page . . . we present little TS*, the latest addition to the popular line of Warren Screw Pumps.

Like his big brother, IGAB**, he'll lift any noncorrosive liquid—up to 450 lbs. (IGAB goes about 1200 lbs.) And TS is ideal for *heavy* fuel oil services.

He's easy to take care of, too . . . like replacing the rotor by simply sliding a new one through the rear head. No adjustment is necessary.

And best of all—TS will do the job for half the price!

When you have a problem that can be handled by a smaller pump, consider this efficient little Warren TS. It saves on costs, takes up less space, is easy to maintain and guarantees the same pumping satisfaction of all experience-rated WARREN PUMPS.

*Twin Screw
**Internal Gear And Bearing (Quadruple Screw)

WARREN

WARREN PUMPS, INC., Warren, Mass.

G-5

When inquiring check 4205 opposite last page

Old aluminum designations converted with chart

Designed for converting to new aluminum designations now in use, chart is part of data included on two-page sheet. Other aluminum information includes: functions of alloying elements, melt and flow temperatures and plastic ranges, composition of alloys, government specifications, solders, and how to use various alloys.

Aluminum designation conversion chart is issued by All-State Welding Alloys Co., Inc., Dept. CP, 249-55 Ferris Ave., White Plains, N.Y. When inquiring specify 4206 opposite last page.

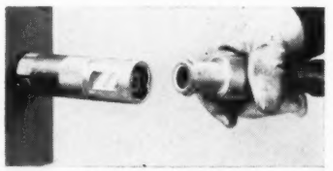
Combination hand valve and quick coupler is safety device . . .

unit gives fool-proof, leak-proof service

Uses: Device was developed for application on trucks with ammonia refrigeration lines; in handling LP gases, both on trucks and storage tanks; and on vehicles with self-contained refrigeration units, compressors, and other equipment requiring safe, fail-proof couplings.

Features: Usable as hand valve and quick-coupler, unit gives fool-proof, leak-proof service. It serves as safety device for main valve. Primary valve is first to open and last to close.

Description: Valve-coupling consists of primary valve within secondary valve. When two members are engaged and disengaged, O-rings seal connection prior to opening of two poppet valves and main piston valves. In breaking



Fail-proof, leak-proof valve coupling serves as safety device

STOP USING ANTIQUES

For ten years the "GLASFAB" system of fast, easy, long-lasting jacketing for insulation has been successfully used against the weather and corrosive fumes. This system combines the "GLASFAB" brand loom woven membrane and custom formulated asphalt type BCM.

The "GLASFAB" brand fabric, made of rot-proof, acid-proof glass fibers, reinforces the asphalt with its uniform open mesh of strong textile yarn. Its flexibility makes it easy to form around irregularities.

This combination is ideally suited for use on insulated tank, vessels and lines. Less expensive than ordinary methods, the "GLASFAB" brand system gives a seamless, reinforced, weather-proofed insulation jacket.

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TWINSBURG-MILLER CORPORATION
P. O. BOX 207 TWINSBURG, OHIO

When inquiring check 4207 opposite last page

FILPACO FILLERS

For ALL types of Containers & Applications

PISTON FILLER
Fills practically all types of containers . . . jars, bottles, cans or tubes. For viscous liquids, semi-liquids, creams, pastes and greases . . . FAST . . . EASY . . . SANITARY.

SYPHON FILLER
For waters, acids, alcohols, light oils, medicinal, liquid soap.

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Semi-automatic . . . portable . . . straight line. For: extracts, syrups, beverages, wines, whiskies, chemicals, nail polish, pharmaceuticals, etc.

OTHER WELL-KNOWN FILPACO PRODUCTS:
Filters, stainless steel storage and mixing tanks, portable agitators, filter paper, cloth and non-woven fabrics.

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The FILTER PAPER CO.
2432 S. Michigan Avenue, Chicago 16, Illinois

When inquiring check 4208 opposite last page

solved with the

Graham

most reliable variable speed drive made

- **ULTIMATE IN SIMPLICITY AND COMPACTNESS**—a straight line extension of a standard induction motor—or available without motor.
- **UNLIMITED SPEED RANGE** — from any desired maximum speed to zero, including reverse, without stopping motor.
- **UNMATCHED ACCURACY**—of speed setting and re-setting and speed holding.
- **NO PERISHABLE PARTS**—such as belts or tubes, requiring periodic replacement.
- **PROVED PERFORMANCE**—twenty years satisfactory use as standard equipment.
- **LOW COST**—a better job for less money.

GRAHAM TRANSMISSIONS, INC.
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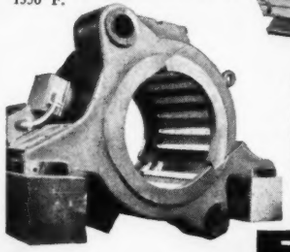
When inquiring check 4209 opposite last page

A GUARANTEED HEAT SOURCE, *Easily Installed*

"FOLDED-and-FORMED" Heating Elements

are quickly, easily installed in furnaces, ovens, kettles, etc., to assure a heat source unequalled for quick rise to temperature; long-life efficiency; low-cost maintenance and repairs.

STANDARD RACKS
Temperatures from 750° to 1700° F.
Sizes 12" x 12". Installed vertically or horizontally, side-by-side, end-to-end, or in banks, to meet K. W. requirements. Five-year guarantee, at temperatures to 750° F. or 1350° F.



CUSTOM BUILT RACKS
Available in wide range of sizes and combinations, to fit any flat or curved area, to provide maximum K. W. at temperatures to 1850° F. Hundreds of different applications are demonstrating the outstanding efficiency and economy of "F-and-F" Heating Elements. You, too, can use them *profitably!*

View of Extrusion Press Container Housing—container removed—temperature 1200° F. Heaters keep container and die at aluminum extrusion temperatures.

TREN INC.
Electrically Heated Industrial Equipment
242 LEVERINGTON AVE., PHILA. 27, PA.
In Canada Supreme Power Supplies Limited Toronto 14

When inquiring check 4210 opposite last page

out, main piston valve seals off line flow with subsequent reduction of pressure within valve. Design permits easy and quick servicing of O-rings, connection seals, etc. Manufacturer states that valves can be broken down, serviced, and re-sealed in 5 min.

("Dubl-Safe" valve coupling is product of Harbison-Fischer Mfg. Co., Dept. CP, PO Box 127, Fort Worth, Texas. Check 4211 on form opposite last page.)

Mixing is complete — no straining needed . . .

can be used in open containers without hazard of splashing

Uses: For mixing aluminum and lead base paints, powders, or latex.

Features: Mixing is reported to be so complete that straining is unnecessary. Device can be used in open containers without splashing or cutting into container walls.

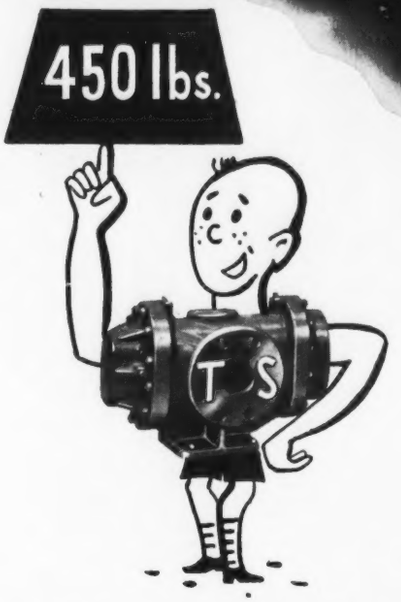
Description: Rugged but simple mixer can be rotated by practically any standard make of electric or pneumatic portable power tool. It is not clamped to container but is moved about by operator holding power tool. Mixer is so designed that operator can thoroughly free container walls and bottom from solids.

(Mixer is product of Jiffy Mixer Co., Inc., Dept. CP, 515 Market St., San Francisco 5, Calif. Check 4212 on form opposite last page.)

Performance charts on centrifugal fans

Manufacturer's line of backward curved-blade centrifugal fans is listed in 60-page bulletin. In addition to performance charts, bulletin contains specifications, features, and component and unit descriptions.

Bul C-103 is issued by Chicago Blower Corp., Dept. CP, 9863 Pacific Ave., Franklin Park, Ill. Specify 4213 opposite last page.



I'm "Little Brother TS"

... the *newest* Warren Screw Pump

TS* is the name. And just compare TS's capabilities with big brother IGAB's:**

	TS	IGAB
Capacity	to 600 gpm	to 4000 gpm
Pressure	to 450 psi	to 1200 psi
Viscosity	to 150,000 ssu	to 150,000 ssu
Speed	to 3000 rpm	to 1750 rpm

There are many pumping jobs that Warren's dependable little TS can do just as well as a pump costing twice as much. Get all the details now. Just fill out and mail the coupon below.

*Twin Screw
**Internal Gear And Bearing (Quadruple Screw)

G-5A

WARREN PUMPS, INC., Warren, Mass.

Gentlemen:

Please send me complete information on "TS"—Warren's newest screw pump.

Name and Title.....

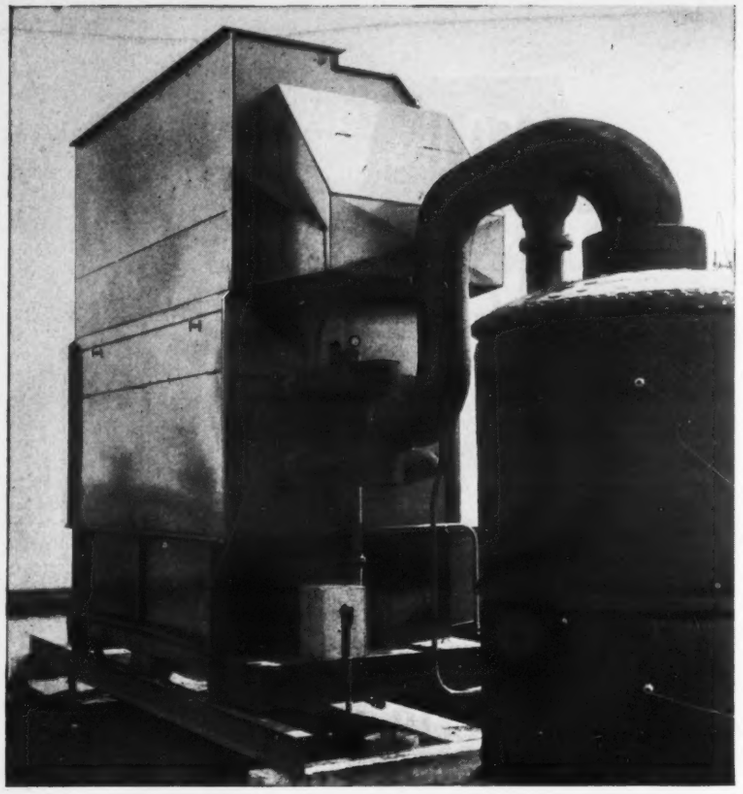
Company.....

Address.....

City.....Zone.....State.....

☐ PLEASE HAVE YOUR REPRESENTATIVE CALL.

When inquiring check 4214 opposite last page



Save Water and Power in Condensing Vapors

● NIAGARA *AERO* VAPOR CONDENSERS give sustained full capacity in condensing vapors by evaporative cooling with only nominal use of water. You have no problems of water availability or disposal, or quality, or temperature.

Non-condensibles are effectively separated and subcooled, giving better vacuum pump operation. Liquids and vapors are always held at constant temperatures. Cooling effect is directly proportional to the load. You get uniform distillation products the year round. You get better quality control and higher production. You save power and steam. Capacities up to 30 million BTU.

Write for full information.
Ask for Bulletin 129R.

NIAGARA BLOWER COMPANY
Dept. CP-6, 405 Lexington Ave. New York 17, N. Y.
District Engineers in Principal Cities of U. S. and Canada

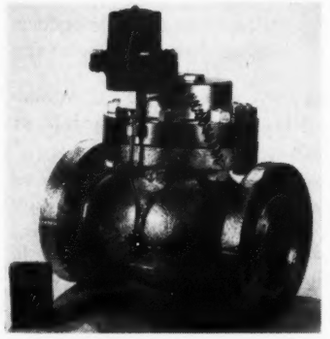
When inquiring check 4215 opposite last page

Packless operation offered with solenoid valve

Uses: For application with liquids to 600 psi.

Features: Valve has renewable seat ring and unbreakable piston ring. Packless operation is offered over wide pressure range. Valve is designed to eliminate damaging hammer and shock.

Description: Cast steel solenoid valve in either globe or angle pattern, with screwed or flanged pipe ends, is available in sizes from 2 through 4". Coils are unconditionally-guaranteed, waterproof, molded coils for temperatures to 250°F, and silicone-insulated coils for higher temperatures.



This 3" solenoid valve is equipped with explosion-proof coil housing

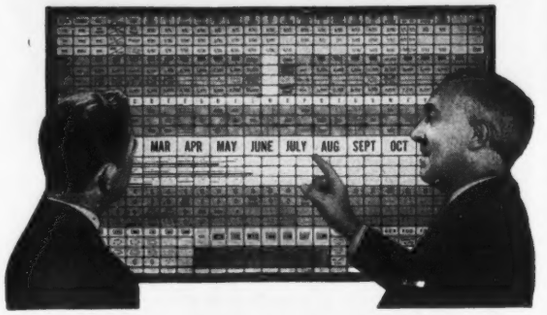
(Cast steel solenoid valve is product of J. D. Gould Co., 4707 Massachusetts Ave., Indianapolis 18, Ind. . . . or for more information check 4216 opp. last page.)

Extruder's performance covered in bulletin

Bulletin of 46 pages presents, in detail, design and performance features of manufacturer's extrusion equipment, and compares them with those of other machines. All components of single-screw-type extruders are examined in logical fashion.

Bul E-3 is issued by Prodex Corp., Dept. CP, King George Post Rd., Fords, N.J. Specify 4217 opposite last page.

How To Get Things Done



BOARDMASTER VISUAL CONTROL

Gives you a Graphic Picture of your operations, spotlighted in color. You See what is happening at a glance. Facts at eye level — saves you time, prevents errors.

Simple, flexible — easily adapted to your needs. Easy to operate. Type or write on interchangeable cards, snap in grooves. Ideal for production, scheduling, sales, traffic, inventory, etc. Made of metal. Compact, attractive.

Complete Price $49.50 Including Cards

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GRAPHIC SYSTEMS **55 WEST 42nd STREET NEW YORK 36, N. Y.**

When inquiring check 4218 opposite last page

PREFERRED FOR
POLISHES
Tamms

Tamms products are widely used in the polish trade, preferred for quality results.

TAMMS SILICA
Soft Amorphous Type
Grades to meet various abrasive requirements . . . for all kinds of metal polishes.

TAMMS MULTI-CEL
Diatomaceous Earth
Top grade, ground extremely fine . . . a milder abrasive than silica. Best for silver polish.

TAMMS TRIPOLI
Rose and Cream Colors
Once-ground, double-ground and air-float . . . ideal grades for buffing and polishing. Also rubbing compounds.

TAMMS BENTONITE
(Suspension Medium)
A very finely ground colloidal clay . . . wholly soluble. Absorbs five times its weight in water.

Write today for prices and samples.

DEPT. RM-28
TAMMS INDUSTRIES, INC.
228 N. LA SALLE ST. CHICAGO 1, ILL.

When inquiring check 4219 opposite last page

Gas-tight Tank

Starts on page 184

solution and observed for bubbles or flaking that would indicate leaks. Pressure was increased to 18¾ psig for a strength test. As a final test shell was pressurized to 15 psig and sealed for eight days with appropriate measurements taken to determine maximum volume loss over a 24-hour period.

Results: Leakage during sustained pressure test was found to be less than 100 cu ft per 24 hours, well under specification allowance of 500 cu ft. Structure passed all tests without a failure.

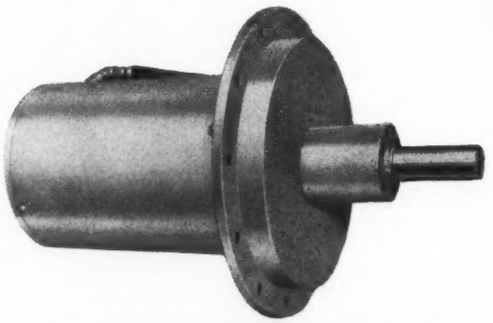
(Construction and testing of containment vessel were performed by Graver Tank & Mfg. Co., Inc., Dept. CP, East Chicago, Ind. . . . or for more information check 4220 on form which is located opposite last page.)

Liquid cooling of motor enclosure permits efficient operation at high temperatures . . .

positive sealing makes motor suitable for operation under pressure or vacuum

Uses: Developed for applications where shafts are subjected to temperatures up to 2100°F.

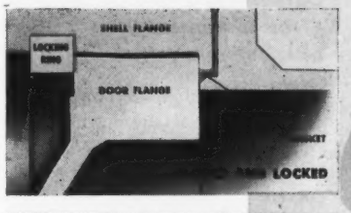
Features: Shaft and electric windings of motor are liquid cooled. Housing is positively sealed, making motor suitable for operation under pressure or vacuum conditions.

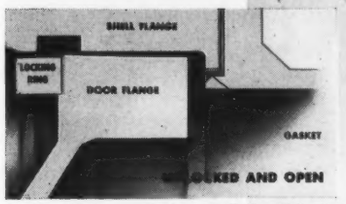


Liquid cooling of motor enclosure permits operation under high ambient temperature conditions

Description: Motor is available in ratings from 1/3 to 30 hp, in standard induction-motor speeds. Shaft sizes and extensions are furnished to accommodate specified load and speed conditions.

(Heat-resistant, sealed motor is product of Kaybee Engineering Co., Dept. CP, 100 E. Quincy St., Westmont, Ill. . . . or for more information check 4221 on convenient Reader Service slip which is located opposite last page.)





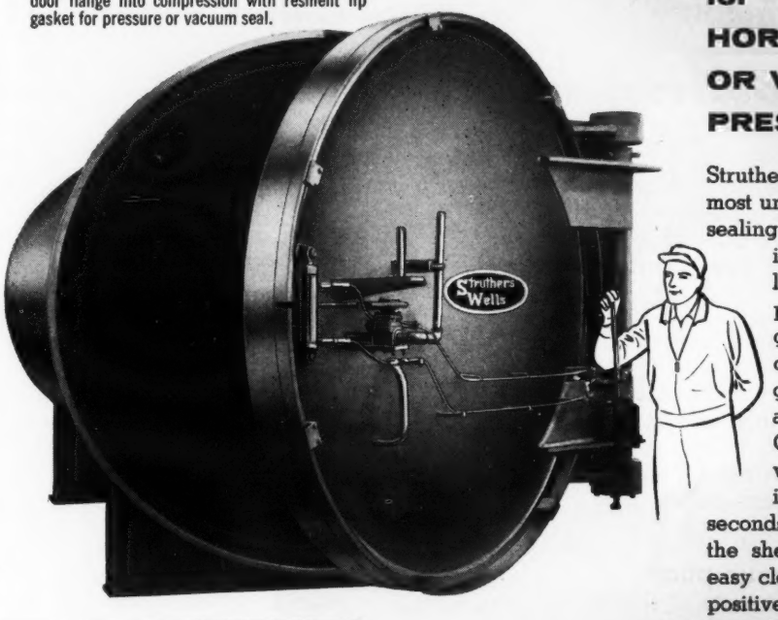
Locking ring expands into shell flange forcing door flange into compression with resilient lip gasket for pressure or vacuum seal.

Quick Opening

STRUTHERS WELLS

RING-LOK DOORS

for HORIZONTAL OR VERTICAL PRESSURE VESSELS



Struthers Wells Ring-Lok . . . the most uncomplex and rugged self-sealing pressure vessel closures in the industry. A simple locking ring which expands into the shell flange groove locks the door securely against a resilient gasket for positive sealing against pressure or vacuum. Operation of locking device is hydraulic and opening can be completed in 45 seconds. Unobstructed access to the shell flange groove assures easy cleaning and a continuously positive seal. Available in sizes up to 12' dia. for vertical or horizontal vessels operating at temperatures up to 400 deg. F. and pressures to 350 psi.

STRUTHERS WELLS PRODUCTS

BOILER DIVISION
BOILERS for Power and Heat . . . High and Low Pressure . . . Water Tube . . . Fire Tube . . . Package Units

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Crystallizers . . . Direct Fired Heaters . . . Evaporators . . . Heat Exchangers . . . Mixing and Blending Units . . . Quick Opening Doors . . . Special Carbon and Alloy Processing Vessels . . . Synthesis Converters

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STRUTHERS WELLS *Corporation*

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Plants at Titusville, Pa. and Warren, Pa.

Offices in Principal Cities

When inquiring check 4222 opposite last page

PEABODY TOWERS
CLEAN · COOL · ABSORB

PEABODY *delivers more!*

- **Compact**
  - Minimum diameter due to maximum free space velocity
  - Minimum height due to maximum efficiency with few contact stages
- **Efficient**
  - Intimate gas-liquid contact
  - High heat transfer rate
  - Close terminal temperatures
  - Maximum cooling effect
  - High absorption rate
  - Maximum cleaning effect
  - Flat performance curve
- **Economical**
  - Low liquid consumption
  - Low liquid pressure
  - Low gas pressure loss
- **Flexible**
  - Pressure—1 p.s.i.a. to 465 p.s.i.a.
  - Temperature—to 3500° F.
  - Capacity—100 to 200,000 C.F.M.
  - Installation—vertical or horizontal
  - Material—steel, lead, plastic
- **Adaptable**
  - Various process cycles
  - Clear liquids or slurries
  - Corrosive or non-corrosive fluids

PEABODY ENGINEERING CORPORATION
232 MADISON AVENUE, NEW YORK 16, N. Y.
OFFICES IN PRINCIPAL CITIES
PEABODY LIMITED • LONDON, S.W. 1, ENGLAND 7-120

When inquiring check 4223 opposite last page

Oxidation resistance given to copper wire by aluminum "skin" . . .

permits high-temp operation of electrical equipment

Uses: Conducting electrical current in equipment operating at elevated temperatures.

Features: Enameled, aluminum-clad copper wire combines electrical conductivity of copper, high oxidation resistance of aluminum, and added protection of insulating enamel. Wire shows conductivity about 85% of International Annealed Copper Standard and can withstand high temperatures longer.

Description: Copper rod is first plated with thin layer of silver, which acts as barrier to the interaction of copper and aluminum. Silver-plated copper rod is then inserted into thin-walled tube of aluminum. Aluminum-jacketed rod is rolled into rod of smaller diameter and then drawn through dies into wire of desired size and shape. Finished wire is coated with high-temperature insulating enamel. Aluminum-clad copper wire, about size of lead in ordinary mechanical pencil, has an aluminum "skin" of about 0.0025" thick.

(Aluminum-clad copper wire is product of Westinghouse Electric Corp., Dept. CP, Box 2278, Pittsburgh 30, Pa. Check 4224 opposite last page.)

Hose connection catalog also instruction manual

Catalog of 12 pages lists standard type hose clamps, grooved hose fittings, and special tools and replacement parts. Separate sections are devoted to information on methods of applying equipment, various uses, and explanation of clamping method. All equipment is illustrated.

Cat 300RG-56 is issued by Punch-Lok Co., Dept. CP, 321 N. Justine St., Chicago 7, Ill. Specify 4225 opposite last page.

faster, lightweight

HYDRAULIC PIPE BENDER
GREENLEE NO. 880

Bends pipe or conduit 90° with one ram stroke
Handles ½-in. to 2-in. pipe or conduit
Rugged aluminum alloy construction slashes weight
Every bend perfectly uniform
One man easily carries and operates it anywhere
Separate two-speed hand pump and ram give faster handling and setup
Operates with fast GREENLEE 798 Power Pumps
Thin-wall conduit, tubing, and bus bar attachments available
Write for illustrated Bulletin E-217

Also: Ask about the new GREENLEE No. 884 Hydraulic Pipe Bender . . . bends pipe and conduit up to 4" full 90° in one fast stroke.

GREENLEE
GREENLEE TOOL CO.
2386 Herbert Ave., Rockford, Ill.

When inquiring check 4226 opposite last page

Over 85% of the torque wrenches used in industry are
STURTEVANT
TORQUE WRENCHES
Read by Sight, Sound or Feel

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

in inch grams
...inch ounces
...inch pounds
...foot pounds

Every manufacturer, design and production man should have this valuable data. Sent upon request.

P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS

When inquiring check 4227 opposite last page

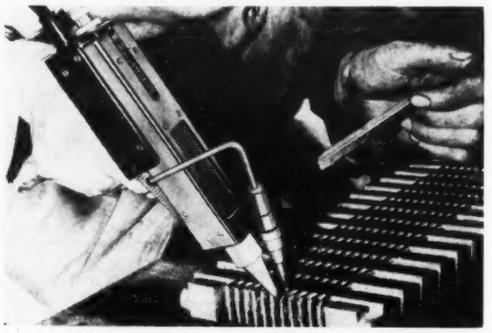
Aluminum soldered without flux with ultrasonic iron . . .

cavitation removes oxide film from metal's surface, permits tinning to take place

Uses: Soldering aluminum.

Features: Unit is capable of soldering aluminum without flux by completely removing oxide film on metal surface. It enables strong, noncorroding bonds to be made with the ease of normal soft-soldering operation.

Description: Soldering iron applies ultrasonic waves through molten solder to surface of aluminum or other light metal. "Cold boiling" effect (cavitation) is produced within the solder. Cavitation bubbles completely remove oxide film from



Ultrasonic soldering iron weighs only two pounds

metal surface, permitting wetting action by solder, and tinning to take place. Either chisel-shaped or tapered copper bit can be used. Iron, which weighs only two lb, has built-in heating element and servo stability system, and has no frequency drift.

(Mullard ultrasonic soldering iron, Model E 7587 M, is available from Acoustica Associates, Inc., Dept. CP, Glenwood Landing, Long Island, N.Y. . . . or for more information check 4228 on form opposite last page.)

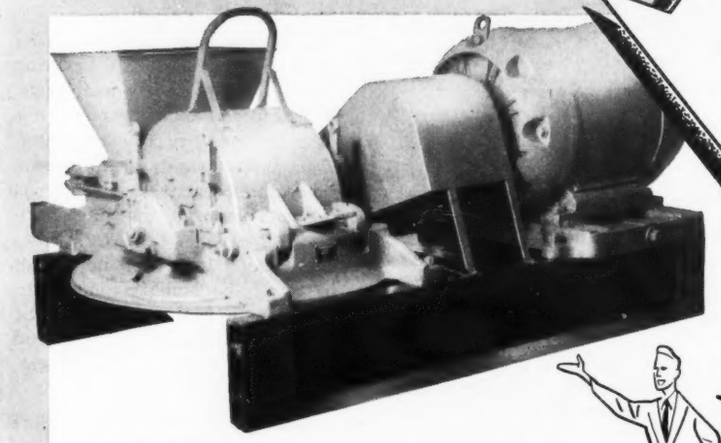
Detailed dimensional data on cooling towers

Structural and mechanical advantages of manufacturer's cooling towers for air conditioning and industrial service are illustrated and explained in 16-page bulletin. Eight-page fold-out section containing detailed dimensional data and drawings is featured. Bulletin includes information on optional accessories and recommended specifications.

Bul 5.1.902 is issued by J. F. Pritchard & Co., Dept. CP, 4625 Roanoke Parkway, Kansas City 12, Mo. When inquiring specify 4229 on form opposite last page.

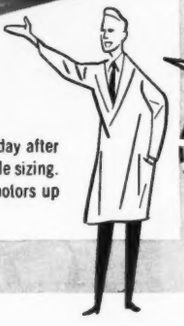
From TEST to TONNAGE . . .

"SCALE UP" with Mikro-Pulverizers



THE BANTAM PULVERIZER is a complete miniature grinding plant, perfect for pilot plant and experimental work. Easy and economical to operate, the BANTAM utilizes a ¾ or 1 hp motor, and has an average capacity of 75-100 lbs. per hour.

NO. 4 MIKRO-PULVERIZER —a rugged, high-capacity mill, designed to produce specified results day after day, 24 hours a day . . . readily adjustable for speedy changes of particle sizing. MIKRO-PULVERIZERS are available in four models (Nos. 1-4) with motors up to 75 hp, and capacities to 25,000 lbs. per hour.



"ENGINEERED FOR DEPENDABILITY . . . ECONOMY . . . HIGH PRODUCTION!"

Whatever your grinding requirements, there's a MIKRO-D pulverizing unit tailor-made for the job. You'll find an economical, miniature plant, ideal for small production work . . . a choice of stepped-up intermediate sizes to serve growing production demands . . . or an ultra-high capacity mill designed to produce more than ten tons per hour! In addition, you'll discover that the quality and fineness of grind specified for your product can be exactly duplicated, in any quantity, on every pulverizer in the MIKRO-D line!

For a laboratory demonstration of the results you can expect from these MIKRO-D units, send us a product sample and your specifications. We believe you will be convinced that low-cost, dependable MIKRO-D equipment—now serving in chemical processing plants throughout the world—can put more profit in your production. Of course you are invited to write for full information on the complete MIKRO-D line.

Mikro-D

PULVERIZING MACHINERY DIVISION

METALS DISINTEGRATING CO., INC.

60 Chatham Rd. Summit, N. J.

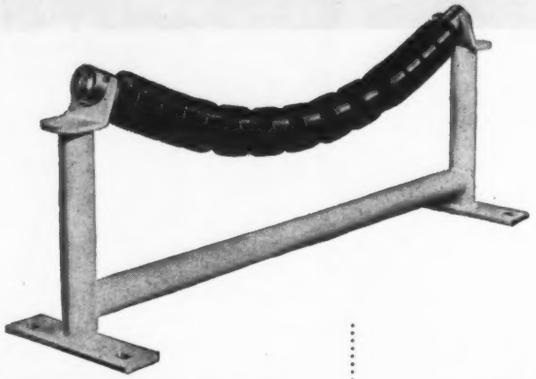
GENUINE MIKRO-D REPLACEMENT PARTS AVAILABLE FROM LARGE STOCK WITHIN 48 HOURS.

MANUFACTURERS OF PULVERIZING, AIR CONVEYING AND DUST COLLECTION EQUIPMENT

When inquiring check 4230 opposite last page

We've been asked...

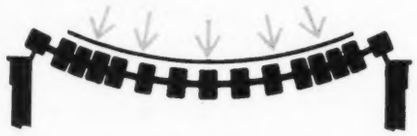
"WHAT IS THE JOY LIMBEROLLER BELT CONVEYOR IDLER?"



JOY LIMBEROLLER BELT CONVEYOR IDLER

CONVENTIONAL IDLER

Radically different from all other idlers, the Limberoller is a flexible steel cable suspended between two bearings... to which neoprene discs are molded ... forming a single roll idler which turns on its own axis. This imparts a flexing action which is self-cleaning . . . prevents material buildup, a source of trouble with conventional idlers.



Supports the belt throughout its entire width . . . doesn't have the unsupported gaps left between the rolls like conventional idlers. Increases belt life 20% and more. Materials don't "bump along" from idler to idler, either.

Two bearings, instead of six. They are up out of the dirt zone, not hiding down under the belt. Joy has never replaced a single bearing due to normal failure. Heard enough? There's more . . . get the whole story from ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

JOY... EQUIPMENT FOR ALL INDUSTRY

WSW L8331-160 **Write for free bulletin 160-80**

CONVEYORS • AIR AND GAS COMPRESSORS • FANS • BLOWERS • ROCK DRILLS • BLAST HOLE DRILLS HOISTS • ELECTRIC PLUGS, RECEPTACLES AND POWER DISTRIBUTION SYSTEMS

When inquiring check 4231 opposite last page

ENGINEERING

This air-cooled chiller uses water part-time for heavy loads . . .

for use in water-short areas or with inadequate drains

Uses: For chilling liquids such as coolants and hydraulic oils.

Features: Unit, under normal conditions, uses only air as cooling medium. Water is used as auxiliary only during excessive high production or extra hot weather.

Description: Chiller is recommended for use in areas where water is scarce or where existing drain systems are inadequate. When normal operating pressure is exceeded on air cooled radiator, water automatically enters system, relieving the excessive pressure. As pressure decreases, water automatically shuts off. Cabinet encloses entire unit. Helical coil or coolant passage is built above compressor. Model with 7½-hp semi-hermetic unit is 26" square, 53" high, and will handle 30 gpm with 6° temperature difference.

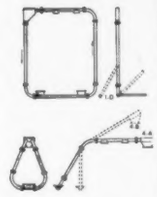
(Liquid coolant chiller is product of Lundholm Manufacturing Co., Dept. CP, 1121 Charles St., Rockford, Ill. . . . or for more information check 4232 on Readers Service slip opposite last page.)

Lift-plug valve detailed

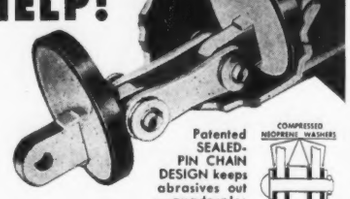
Description, advantages, and methods of operation of company's non-lubricated lift-plug valve are presented in 60-page catalog. Also contained is information on working and test pressures, pressure-temperature ratings, recommended spare parts, and dismantling procedure. Reprint of story featuring use of valve in plant operation is included.

Cat on non-lubricated lift-plug valve is issued by Cameron Iron Works, Inc., Dept. CP, PO Box 1212, Houston 1, Texas. For information reader may simply check 4233 on convenient Reader Service slip which is located opposite last page.

Examples of a few typical circuit plans.



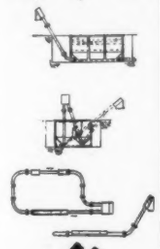
HERE'S HELP!



Patented SEALED-PIN CHAIN DESIGN keeps abrasives out —quadruples chain life.

COMPRESSED NEOPRENE WASHERS

Hapman TUBULAR CONVEYORS



Move almost any flowable material—wet or dry—through any plane or angle . . .

Make *big savings!* Move bulk materials *automatically*—up, down, through walls, around corners and obstacles with a Hapman! Circuits like these or complex layouts engineered to *your* needs. Usually a *single* drive unit serves where other conveyors need several. Design cuts costs. Dust and liquid *tight!*

WRITE for Circuit Bulletin and Catalog C-67

Hapman CONVEYORS, INC.

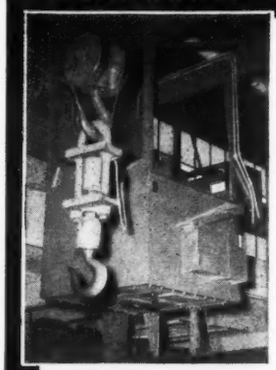
DIVISION HAPMAN-DUTTON COMPANY

KALAMAZOO MICHIGAN

In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

When inquiring check 4234 opposite last page

Ametron® ELECTRONIC CRANE SCALES



One of the leading steel companies weighs its heavy pipes quickly and accurately. 5, 10, 15 tons of metal weighed and recorded on tape or cards by the Ametron Electronic Scale.

New low costs, improved models. Write for free Ametron Brochure 4.

Tank scales
Hopper scales
Crane scales
R.R. Track scales
Truck scales and others

STREETER-AMET COMPANY
GRAYSLAKE, ILLINOIS

THE STANDARD OF ACCURACY SINCE 1888

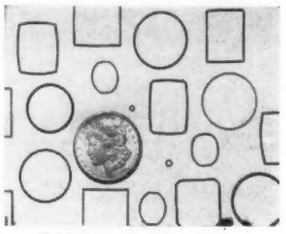
When inquiring check 4235 opposite last page

Dimensional tolerances of ±0.001" with molded rubber gaskets . . .

packings have round cross sections as small as 0.020", various shapes, mitered corners

Uses: Gaskets can be sealing small units with little packing space.

Features: Gaskets have dimensional tolerances as close as ±0.001". They have round cross sections as small as 0.020", various shapes, and mitered corners.



Gaskets can be made in varying shapes

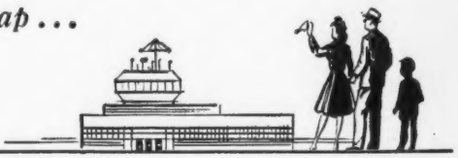
Description: Rubber gaskets made from injection molding process have high material density and close tolerances. Most natural and synthetic rubbers, including neoprene, Buna N and silicone, can be molded with this process.

(Injection molded rubber gaskets are available from Minnesota Rubber & Gasket Co., Dept. CP, 3630 Wooddale Ave., Minneapolis 16, Minn. . . . or for more information check 4236 on form opposite last page.)

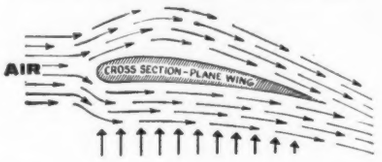
"You chemists are always inventing something, including alibis and breath killers!"

HOW THIS MODERN STEAM TRAP UTILIZES PRINCIPLE OF AIRPLANE LIFT!

New application of an old principle produces totally different type of steam trap . . . of great simplicity and effectiveness



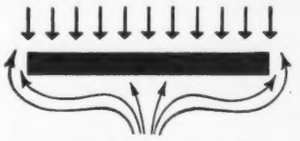
THIS GIVES AN AIRPLANE LIFT



Greater speed of air over curved upper wing surface creates lower pressure over this area (Bernoulli's Law) . . . resulting in **lifting** force.

THIS SAME PRINCIPLE USED TO CLOSE SARCO TD STEAM TRAP VALVE

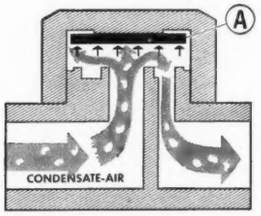
Valve is a simple hardened stainless steel disc.



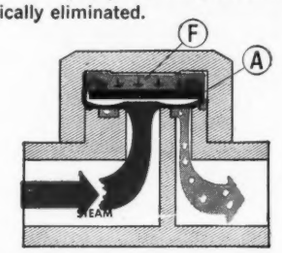
High velocity steam jet across bottom of valve disc creates low pressure area — resulting in **downward** force.

ONLY SARCO TD USES THIS UNIQUE OPERATING PRINCIPLE

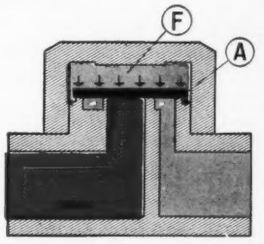
Result: Extreme simplicity—no valve mechanism—maintenance practically eliminated.



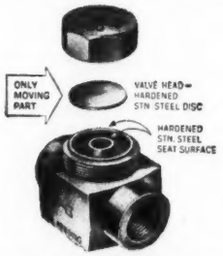
1. Inlet pressure raises disc "A" from seat . . . immediate discharge of air and condensate at steam temperature.



2. Steam follows condensate and the high velocity jet across bottom of disc "A" creates low pressure area (Bernoulli effect) . . . jet is deflected into chamber "F" where it builds up pressure by recompression and this pressure acts on top of disc "A" . . .



3. Pressure in chamber "F", acting on full top area of disc "A", exceeds force of incoming steam and low pressure area under disc . . . and immediately forces it down, closing inlet. As condensation decreases pressure in chamber "F", disc rises and steps 1 or 2 repeat.



Small size . . . large capacity

Only 3 parts . . . all stainless steel. Sizes ⅜ to 1"—each body is as small as a tee fitting! Capacity is determined not by a bulky body but by the effective orifice, valve action, pressure drop and condensate temperature.

A few of many advantages

* *Practically no maintenance*—no valve mechanism, no narrow channels. Trouble-free, simple design.
* *Cuts trap inventory*—one large capacity seat for all pressures . . . for heavy, light, or no condensate load.
* *Self-adjusting for pressures 10 to 600 psi*—not a single change or adjustment required.
* *Operates perfectly when pressure fluctuates*—throughout full pressure range.

SEE FOR YOURSELF

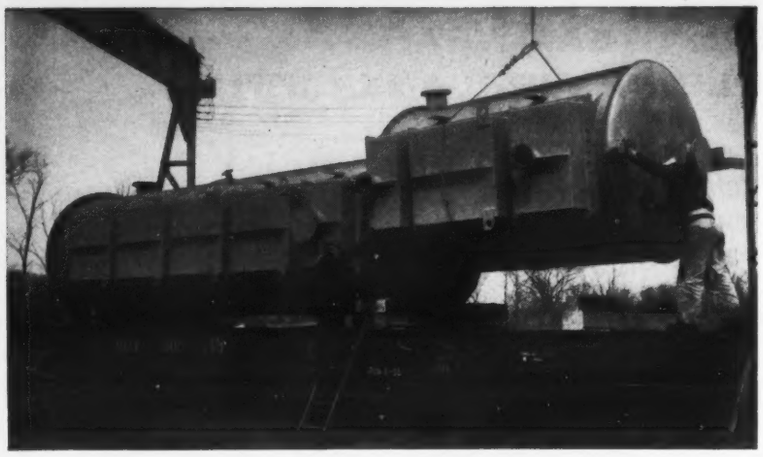
We will gladly send you a Sarco TD Steam Trap and strainer for 60-day trial. No cost or obligation. Advise size —⅜, ½, ¾ or 1"—and application. Sarco Company, Inc., Empire State Bldg., New York City.

2204-C

SARCO Thermo-Dynamic STEAM TRAP

THE MODERN TRAP THAT IS MAKING STEAM TRAPPING HISTORY!

When inquiring check 4237 opposite last page



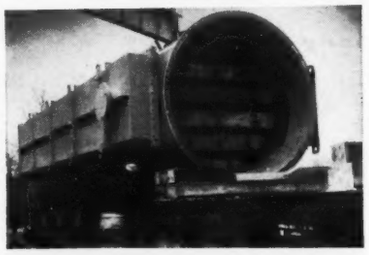
First fabricated ammonia still ...built at Downingtown for Koppers Company, Inc.

When Koppers Company, Inc., Engineering and Construction Division designed this welded carbon steel plate ammonia still to replace its previous cast iron design, it naturally chose the fabricator with care. Close tolerances were required on positioning of risers, riser slots, bells, trays and weirs. We're proud of the part Downingtown had in this pioneering effort. This still is used for stripping the ammonia from ammonia liquor produced in a chemical recovery coke plant.

THE UNIT WAS BUILT TO THE FOLLOWING SPECIFICATIONS:

Inside Diameter: 7'0"
Over-All Height: 37'10"
Design Data: 12 psi, 650° F.
Operating Data: 7 psi, 250° F.
Shop Test: 12 psi hydrostatic for 90 min.
Total Weight: 60,000 pounds

Send for bulletins describing our experience and facilities.



Interior of bottom section, showing position of rectangular bells fabricated from stainless steel, type 410. Thirteen trays, with bells.

Downingtown Iron Works, Inc.
144 Wallace Ave., Downingtown, Pennsylvania
division of PRESSED STEEL TANK COMPANY Milwaukee
Branch offices in principal cities
HEAT EXCHANGERS—STEEL AND ALLOY PLATE FABRICATION
CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

When inquiring check 4238 opposite last page

Fast opening, closing of trap minimizes air leakage, pressure drop . . .

condensate ejection is rapid and efficient

Uses: Discharging condensate from compressed air or gas lines.

Features: High-speed opening and closing operation of trap minimizes air leakage, valve chattering, and pressure drop. Unit provides rapid and efficient condensate ejection, continuous operation, with minimum maintenance.

Description: Trap operates simply but effectively. Float in trap is held firmly in place by magnet mounted on pivot arm. When force build-up of condensate overcomes magnetic attraction, float snaps open pilot valve. Air enters pilot valve and forces piston assembly upward. As piston assembly moves upward, it opens main discharge valve. Condensate is forced through discharge valve by system's pressure.

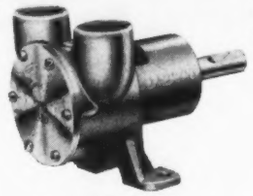
When sufficient condensate has been discharged, float drops, and magnetic attraction to float arm causes snap closing of pilot valve. As valve snaps shut, air supply to piston is cut off. Air in piston chamber bleeds through small orifice; piston immediately returns to its original position, closing main discharge valve.

Piston mechanism is completely sealed off from condensate to prevent damage or clogging. Pressure range of trap is from 10 to 200 psig.

(Mag-Pneu-Power air and gas trap is manufactured by Hankison Corp., Dept. CP, 951 Banksville Rd., Pittsburgh 16, Pa. . . . or for more information check 4239 on convenient Reader Service slip opposite last page.)

This month's Processing & Engineering Data section begins on page 216

cut pumping costs with JABSCO INDUSTRIAL PUMPS



Model 5330
Bronze Construction—
1" Port Size—Sealed
Ball Bearings

- INSTANTLY SELF-PRIMING
- SIMPLE, COMPACT, ONLY ONE MOVING PART
- DURABLE NEOPRENE IMPELLER
- SELF-LUBRICATED
- TROUBLE-FREE OPERATION

HERE'S another Jabsco industrial pump — designed and built for chemical, pharmaceutical and other industrial applications. Ideal for transfer of various liquids and acids—sump drainage, coolant pumping, general transfer, pulp in solution, filtering, brines, plating solutions—even fluids containing foreign matter or particles, silt, crystals, and other gritty materials. Bronze, stainless steel or plastic construction is available to *solve your specific* pumping problems. Pumps either light or heavy viscous liquids. Temperature ranges from 35° to 180° F. Write for a Jabsco factory recommendation for your own needs. Specify application, fluid pumped, temperature, pressure, etc.

PATENTED AND PATENTS PENDING

FREE — send for catalog sheets, detailed information... no obligation, of course!

JABSCO PUMP COMPANY
2031 Lincoln Street, Burbank, California

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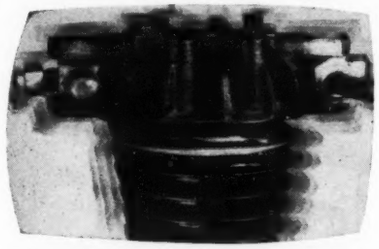

VIBRATION DOES NOT CRACK OR FISSURE THE PLASTIC SEAL

for those hard-to-hold liquids and gases

Leak Lock is a truly remarkable joint sealer, as its plastic base holds chemical solutions and gases that quickly penetrate ordinary sealers.

Leak Lock adheres firmly to most surfaces . steel, iron, copper, aluminum, cork, asbestos, plastics, etc., and stays flexible indefinitely. It is the real answer to those difficult leaking joint problems. Stewart Industries, Inc., 16 Colfax Ave., Clifton, N. J.

Send for FREE SAMPLE for test purposes

Leak Lock

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What's so strange . . .

. . . about our willingness to send you this magazine without demand of a token subscription fee?

Nothing, really.

You see, no publisher of industrial magazines breaks even on subscription revenue . . . not after he's paid out the costs of getting that revenue.

Why, then, are there any "paid" magazines . . . those which charge a subscription fee?

The answer: The "paid" designation permits mailing the magazine at cheaper second class rates than is possible for "controlled circulation" magazines such as CHEMICAL PROCESSING. It all stems back to an old postal regulation that has long outlived its usefulness.

We *prefer* to handpick the men who will receive CHEMICAL PROCESSING magazine, on the basis of continuing research that tells us who are the important men that work in the field our editors and advertisers serve. By selective handpicking, rather than by extracting a "token" subscription fee from anyone susceptible to a subscription pitch, we can be *sure* that we reach the men who matter most in managing chemical processing operations.

Is that so strange?

THE EDITORS
OF CHEMICAL PROCESSING

P.S. Many "paid" magazines have substantial "controlled" circulation . . . up to 30 percent is permitted by postal regulation. And many publishers of "paid" magazines have "controlled" magazines in their stable, too.

That is strange!

Snap-tite
QUICK-CONNECT
QUICK-DISCONNECT COUPLINGS
in larger sizes
immediate delivery
FROM FACTORY STOCKS
Snap-Tite's "H" Couplings are now factory-stocked for quick shipment to you, not only in the smaller sizes (below 1" ID) but in all sizes up to and including 3"—in steel, brass, aluminum, and 303 and 316 Stainless Steel. And "H" Couplings can be made to your order, up to 10" ID.
Available with valves to give two-way or one-way automatic line shut-off, or without valves for straight-thru flow, "H" Couplings are built to handle high pressures in hydraulic and air systems.
Recessed valve washers . . . fluted valve stems . . . valve stops with minimum flow restrictions . . . large inside diameter—allow maximum flow capacity with lowest pressure drop.
See the Snap-Tite representative in your city or write for Bulletin 240.
SNAP-TITE'S "H" COUPLING, SIZE FOR SIZE, IS THE SMALLEST COUPLING WITH HIGHEST STRENGTH AND HIGHER EFFICIENCY
Snap-Tite, INC.
UNION CITY 6, PENNSYLVANIA
SNAP-TITE COUPLINGS CAN HANDLE ALMOST ANYTHING THAT FLOWS
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THE BIG NEWS

in Blends, Emulsions, Dispersions

GAULIN

"Particle Control"

Look what Gaulin *Particle Control* can do for your product . . .

- Improve texture, make a finer, more uniformly stable emulsion.
- Accent taste, scent and color. Lock in subtle flavors and fragrance against evaporation.
- Keep it always good to look at by stopping separation — no more "shake well before using"!

How about your product?

Chances are a Gaulin Homogenizer can help improve some food, beverage or chemical you make. Try this dramatic new approach to blending with a Laboratory Homogenizer for only $75.00 a month.

Homogenizers and Sub-Micron Dispersers Ask for Bulletins H-55 and SMD-55.

The G.T.A. Library of Product Information

Ask for G. T. A. — Gaulin Technical Assistance — for experienced advice and factual data on the best method to mix or move your product. Complete research and test facilities to help you. Write for FREE booklets to get you started. Manton-Gaulin Manufacturing Co., Inc., 55 Garden St., Everett 49, Mass.

Gaulin

MG7-14

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Dryers · Coolers · Ammoniators*
Granulators*
Elevators
Conveyors

FOR THE CHEMICAL INDUSTRY

*T.V.A. Licensed Manufacturer

Renneburg DehydrO-Mat Dryer

Built in a wide range of sizes, the DehydrO-Mat Dryer, though comparable in price, out-performs conventional dryers of similar volume. Compact, it is easy to install in a minimum of space. The varying diameter cylinder regulates air and material velocities . . . controls temperature drop and product retention time . . . assures gentle drying.

Renneburg DehydrO-Mat Cooler

This Counter-Current Cooler is similar in external appearance to the DehydrO-Mat Dryer but operates in a very different manner. Among its many outstanding features are:

1. Dustless Operation
2. Large Capacity
3. Compactness
4. Positive *Controlled* Unloading

Straight Shell Dryers and Coolers also available *Literature and information on request*

Edw. Renneburg & Sons Co.

2639 BOSTON STREET, BALTIMORE 24, MD.

Pioneers in the Manufacture and Development of Processing Equipment for over 80 years.

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briefs

from contemporary publications

Municipal filters

The use of diatomite filters for municipal installations is discussed as a result of a survey questionnaire and the inspection of sixteen diatomite plants. Successful plants derive their water supply from lakes, impounded surface reservoirs, and large rivers. Operating cost data are given. Thirteen pages, six tables, three figures, 12 references. (*"Journal of the American Water Works Association," February* 1957, *page* 174.)

Oxo chemicals

The Oxo process (reaction of olefins with hydrogen and carbon monoxide in the presence of a cobalt salt as a catalyst) results in three leading products — isooctyl, decyl, and tridecyl alcohols. This survey covers production figures, manufacturers, the situation with respect to competition, possibilities for expansion, and flexibility of growth. Four pages, two figures, two photographs. (*"Chemical and Engineering News," March* 18, 1957, *page* 16.)

Plating on aluminum

Plating on aluminum is covered under headings of zinc immersion processes, composition of solutions, composition of alloy, effect of temperature, effect of pretreatment, and extent of fluoride treatment. Five pages, two tables, 11 figures. (*"Metal Finishing," February* 1957, *page* 61.)

Radiation hazards

Under headings of maximum permissible exposure, sources of radiation hazard, factors in plant design, plant operation and economic aspects, the problems of radiation-hazard control for a power reactor are treated. Five pages, three figures, ten references. (*"Mechanical Engineering," March* 1957, *page* 253.)

New paper markets

This stimulating survey written in popular terms ties in uses of paper with the march of civilization and the world of the future. Three pages. (*"Paper Industry," March* 1957, *page* 1039.)

Plastic pipe

Plastic pipe for potable water supplies are discussed by the National Sanitation Foundation. Weathering, burial in soil, and attack by rats have been studied. Taste and color imparted to water were investigated. Three pages, two photographs. (*"Water Works Engineering," February* 1957, *page* 146.)

Predicting costs

Prediction of production development costs is covered under the headings of estimation and principles. Significance and reliability of correlation coefficients are discussed in a statistical treatment. Eleven pages, 10 tables, three figures. (*"Machine Design," February* 1957, *page* 90.)

Flotation testing

By modifying the Hallimond tube, an improved laboratory flotation cell has been developed. Cleanliness, checking, scoop sampling, and flow of gas are discussed. Three pages, five figures. (*"Engineering and Mining Journal," March* 1957, *page* 93.)

Chromatography and petroleum

Gas-liquid chromatography has applications in the analysis of liquid petroleum fractions. A gas density balance is used. Ten pages, seven tables, 11 figures, 32 references. (*"Analytical Chemistry," March* 1957, *page* 320.)

abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you . . .

Pulping red cedar

Bleachable pulps of high strength can be made from western red cedar, with reasonable yield. Rate of pulping depends upon alkalinity of liquor and content of sulfides. Seven pages, three tables, nine figures, 10 references. (*"Pulp and Paper Magazine of Canada," January* 1957, *page* 103.)

Plastics protect pipes

This paper deals with six case histories where polyvinylidene chloride films, in conjunction with microcrystalline wax, are used to protect underground pipes. Five pages, five figures, ten references. (*"Corrosion," March* 1957, *page* 56.)

Paper chromatography

Galacturonic and glucuronic acids can be separated by means of paper chromatography if the glucuronic acid is first lactonized by heating a solution that exhibits a pH value of 2. Two pages, one table, six references. (*"Analytical Chemistry," February* 1957, *page* 257.)

Reinforced plastics

Following aspects of reinforced plastics are discussed: nature, manufacture, repair, production tooling, safety, and what plastics can do. Properties are compared with those of metals. Six pages, 11 photographs. (*"Factory Management and Maintenance," February* 1957, *page* 86.)

Power from the sun

Design characteristics helpful in developing solar-powered equipment are discussed. Recent developments in artificial solar energy and a preview of solar power plants are reported. Three pages, four figures. (*"Electronics Industries," March* 1957, *page* 58.)

Detergents

From England comes this survey of detergents from petroleum. Circumstances that led to the production of synthetic detergents and their advantages over soap are presented. Methods of manufacture are outlined. Three pages. (*"Petroleum," March* 1957, *page* 103.)

Dirt counter for paper

Article describes long-term testing of electronic dirt counter for paper. A statistical study is included. Nine pages, seven tables, seven figures, 17 references. (*"Pulp and Paper Magazine of Canada," March* 1957, *page* 187.)

High-temperature piping

Piping for Dowtherm requires special provisions for cleanliness and leak prevention. Practices for the installation of high-temperature heat-transfer piping for this medium are described. Three pages, four photographs. (*"Heating, Piping and Air Conditioning," March* 1957, *page* 99.)

Corrosion of metals

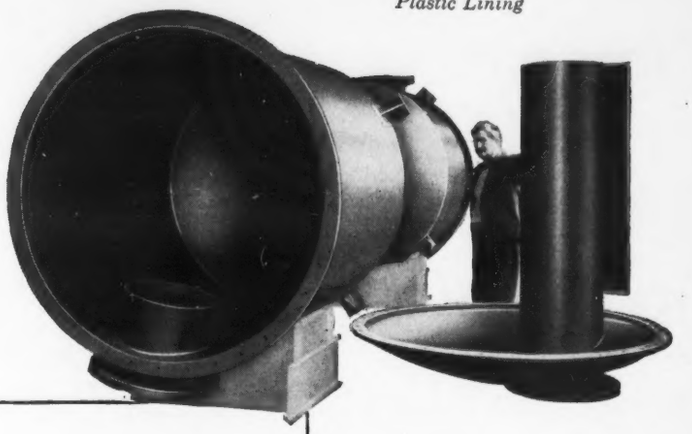
Atmospheric corrosion of metals in transit and storage and methods of control are discussed. Specific recommendations are given. Primary oxides films and critical humidities are covered. Six pages, 13 references. (*"Chemistry and Industry," March* 2, 1957, *page* 242.)

Glycerine

Place of glycerine in the billion-dollar coatings business is made clear. Comparisons with other polyhydric alcohols in the field of resins are given. Three pages. (*"Paint Industry Magazine," Feb.* 1957, *page* 22.)

Turn to next page

Pulp Tank prepared for Plastic Lining



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STAINLESS STEEL FABRICATION

Stainless fabrication is distinctively different from conventional steel working. The Kirk & Blum organization has the special knowledge and technique required . . . and the experience and necessary equipment for this highly specialized type of work. With 47 years of experience in sheet metal fabricating, Kirk and Blum offers quality workmanship, economical fabrication to the most exacting specifications . . . in large or small quantities.

Complete facilities to ¼" capacity for: square or rotary shearing; braking, forming, rolling; punching, riveting, drilling; arc, spot and seam welding; inert gas and submerged arc welding; grinding and finishing. For prompt quotation, send prints and details.

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Literature on request:
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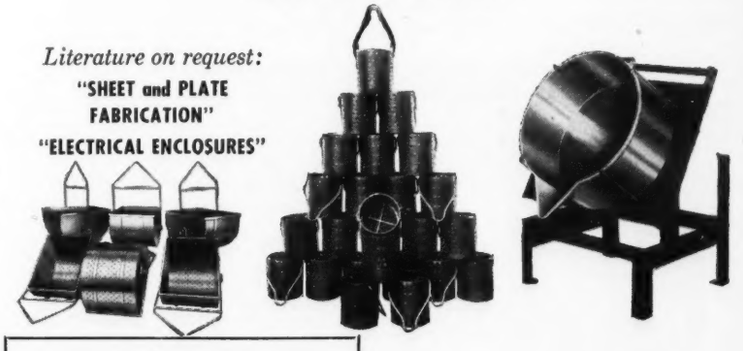

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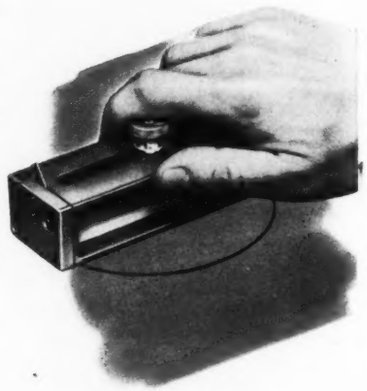

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BRIEFS

Starts on preceding page

Acrylic coatings

Clear lacquers and colored enamels preserve metallic surfaces, seal electronic circuits from moisture, protect chemical and food processing equipment, and provide finishes that retain their color at high temperatures. Four pages, three tables, two photographs. (*"Materials and Methods," December* 1956, *page* 106.)

Polysiloxanes

This paper reports the ingredients and conditions required for sulfur vulcanization of vinyl-substituted polysiloxanes. Reaction steps of vulcanization differ from those for polyisoprene. Six pages, two tables, nine figures. (*"Industrial and Engineering Chemistry," January* 1957, *page* 49.)

Mineral wool

Manufacture and uses of mineral wool are discussed under headings of technique, testing, mineral wool in Britain and America, properties, thermal insulation, insulation against sound, marine work, and filtration processes. Four pages, four tables, three photographs. (*"Chemical and Process Engineering," December* 1956, *page* 422.)

Refractory coatings

Flame-spraying techniques may be used to apply ceramic coatings. Physical and thermal properties, and structure of the following coatings are reported: alumina, zirconia, and zircon. Six pages, eight figures, 11 references. (*"Journal of the Ceramic Society," March* 1957, *page* 69.)

Coking coals

For maximum coking strength, some coals must be pulverized to a greater extent that others because of the heterogeneous nature of coals in general. Recognition of this situation and proper attention to points discussed in this paper can result in significant improvement in the preparation of coke. Seven pages, 14 figures, five references. (*"Blast Furnace and Steel Plant," March* 1957, *page* 301.)

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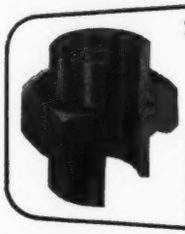

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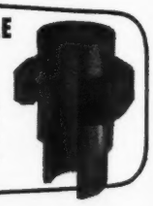

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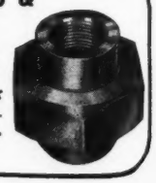

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Cane sugar

From England comes report of manufacture of cane sugar described under the headings of juice extraction, prime movers for mills, steam generation, clarification, treatment of mixed juice, processing of clarified juice, constructional features of evaporator calandrias, crystallization, and centrifuging. Forecast for the industry is given. Four pages, six figures. (*"Chemical & Process Engineering," February* 1957, *page* 55.)

Specifications

Use of the statistical approach is helpful in writing specifications. It enables one to decide which variable to control, how closely it can be controlled, and how much it may actually affect the final product. Three pages, one table, one figure, one reference. (*"Materials and Methods," February* 1957, *page* 109.)

Hydrocarbon nomogram

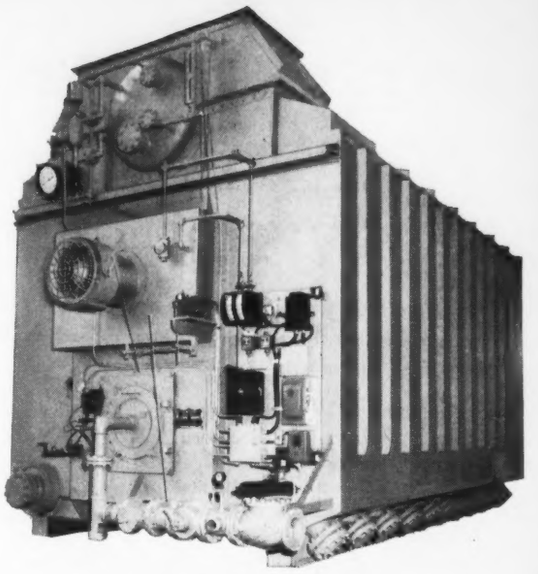
F. W. Winn incorporates in a single nomogram the following properties for hydrocarbons: boiling point, molecular weight, critical pressure, aniline point, heat of combustion, CH ratio, UOP K factor, and specific gravity. Three pages, one figure, 14 references. (*"Petroleum Refiner," February* 1957, *page* 157.)

Quality control of alloys

With improved quality control of properties, high-temperature alloys can be used at higher levels of temperature and stress than are considered to be safe at present. Variation in properties can be minimized by vacuum melting. Five pages, two tables, four figures. (*"Metal Progress," January* 1957, *page* 90.)

Wastes from by-product coke

Guide to wastes from the by-product coke industry includes statement of the problems, raw materials, pollutional effects, analytical methods, and research needs. Twenty-three pages, eight tables, eight figures, 20 references. (*"Sewage and Industrial Wastes," January* 1957, *page* 53.)



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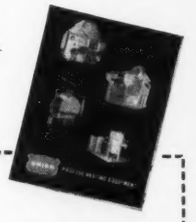

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new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc., are found throughout other sections of the magazine

Drying and calcining equipment described in bulletin

Research and pilot plant equipment for drying and calcining is described and illustrated in eight-page bulletin. Pertinent data including component descriptions and equipment specifications for gas-fired and steam-heated continuous rotary dryers, and gas-fired and electrically-heated continuous combination calciners and coolers are provided. Description and specifications for direct-fired rotary kiln and steam-jacketed batch dryer are also included.

Bul 117 is issued by The C. O. Bartlett & Snow Co., Dept. CP, 6200 Harvard Ave., Cleveland 5, Ohio. When inquiring specify 4249 on form opposite last page.

Describes gas chromatograph for process stream analysis

Bulletin of four pages describes gas chromatograph specifically designed for continuous, automatic analysis of process streams, using unique sampling valve and timing system. Features and specifications are presented.

Bul 802 is issued by Process Instruments Div., Beckman Instruments, Inc., Dept. CP, 2500 Fullerton Rd., Fullerton, Calif. When inquiring specify 4250 on form opposite last page.

Tech bul on acrylonitrile polymers, copolymers

Preferred lab techniques for polymerizing and copolymerizing acrylonitrile are presented in detail in 76-page bulletin. Many examples of acrylonitrile polymers as applied to various industries are set forth. As an aid to polymer chemists, bulletin discusses monomer reactivity ratios and their utilization in designing experimental procedures.

Bul on polymers and copolymers of acrylonitrile is issued by Petrochemicals Dept., American Cyanamid Co., Dept. CP, 30 Rockefeller Plaza, New York 20, N.Y. When inquiring reader may simply check 4251 on form which is located opposite last page.

Portable transistorized PA system featured in equipment catalog

Among wide variety of equipment listed and illustrated in catalog is completely transistorized, portable public address system adaptable for industrial use, as well as for meetings, conventions, etc. Office furnishings, industrial ovens, lockers, safety ladders, and other items are also included.

Equipment manual is issued by Precision Equipment Co., Dept. CP, 3706A N. Milwaukee Ave., Chicago 41, Ill. When inquiring specify 4252 on form opposite last page.

Glass products for laboratory shown in catalog

Dimensions, capacities, and operating characteristics for glass laboratory products are contained in eight-page catalog. Included are fractionating-distillation, packing-type, and concentric-tube columns, still heads, solenoids, condenser-receivers, and many others.

Form 8D1056 is issued by Glass Engineering Laboratories, Dept. CP, 601 O'Neill Ave., Belmont, Calif. When inquiring specify 4253 on form opposite last page.

Guide to better closures for users of fiberboard boxes, packages

Guide for evaluation of methods currently in use to effect economies and stepped-up production in closure of fibreboard boxes is presented in 20-page brochure. It reviews facts taken from user surveys, published work, and manufacturers' statements. Methods such as hand and machine gluing, taping, stapling, and wire stitching are discussed. Special section contains basic rules for sealing of regular slotted containers quoted from Uniform Freight Classification Number 3, Rule 41, Section 7. Section on wire stitching, with brief descriptions of manufacturer's methods, is included.

"A Guide to Better Closures" is issued by Acme Steel Products Div., Acme Steel Co., Dept. CP, 135th and Perry Ave., Chicago 27, Ill. When inquiring specify 4254 on form opp. last page.

Economical, strong thermometers described in bulletin

Strong, 6" thermometer, with reinforced bulb for stirring or crushing crystals, is described in two-page bulletin. Available ranges of C and F models are listed, along with prices.

Bul 8 is issued by The Ealing Corp., Dept. CP, PO Box 90, Natick, Mass. When inquiring specify 4255 on form opposite last page.

Twelve types of conveyors described in bulletin

Detailed information on twelve conveyor units is presented in 32-page bulletin. Numerous photographs, line drawings, and tables of specifications accompany descriptions of the various equipment. Units are shown in operation.

Bul 64 is issued by Standard Conveyor Company, Dept. CP, North St. Paul 9, Minnesota. When inquiring specify 4256 on form opp. last page.

Catalog lists industrial movies

Educational and entertaining motion pictures on steel industry prepared and distributed by manufacturer, are described in 28-page booklet that includes order forms. Information indicates how to obtain films and who is eligible for distribution.

Motion picture catalog is issued by United States Steel Corp., Dept. CP, 525 William Penn Place, Pittsburgh 30, Pa. When inquiring specify 4257 on form opposite last page.

Potassium silicate properties, uses

Seven-page, digest-size booklet offers information on properties and uses of potassium silicate. Use in binders, coatings, gels, and detergents is discussed in "Potassium Silicate Properties and Uses" issued by Philadelphia Quartz Co., Dept. CP, 1158 Public Ledger Bldg., Philadelphia 6, Pa. When inquiring check 4258 opp. last page.

Illustrated wall chart shows how to handle expendable pallets

Wall chart describes in pictures and words efficient methods of handling expendable pallets of wood or non-wood construction. Included are instructions for loading boxes on pallets, handling pallets by fork trucks and hand pallet trucks, and both truck- and car-loading methods.

"How to Handle Expendable Pallets" is issued by Signode Steel Strapping Co., Dept. CP, 2600 N. Western Ave., Chicago 47, Ill. When inquiring specify 4259 on form opposite last page.

Describes centrifugal separator with automatic de-sludger

Continuous, self-cleaning separators, clarifiers, and extractors with automatic sludge discharge are described in eight-page bulletin. Cutaway illustrations show liquid-seal de-sludgers, featuring built-in centrifugal pumps for pressure discharge of liquid phases. Applications, technical data, and capacity charts for complete line of de-sludgers are included.

Bul 2177 is issued by Centrico, Inc., Dept. CP, 75 W. Forest Ave., Englewood, N.J. When inquiring reader may simply specify 4260 on form located opposite last page.

Shows how radiation is monitored at many points from single control

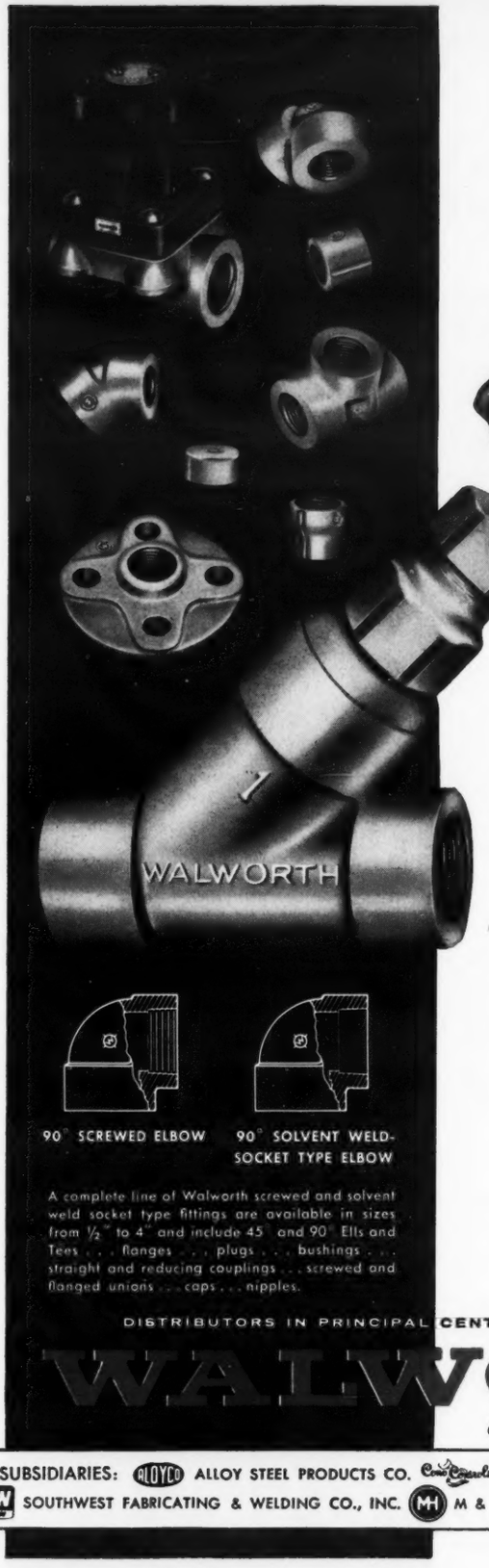
System designed to meet requirements of AEC for monitoring radiation at number of locations from single control point is described and illustrated in four-page bulletin. Uses and features are covered and specifications listed.

Form 3045 is issued by Victoreen Instrument Co., Dept. CP, 5806 Hough Ave., Cleveland 3, Ohio. When inquiring specify 4261 on form opposite last page.

Pictorial review of smelting, refining in colorful booklet

Containing more than 30 color and black-and-white photographs, booklet presents pictorial review of company's mining, smelting, refining, and research operations in production of such metals as lead, zinc, and copper.

"Products and Processes" is issued by American Smelting and Refining Co., Dept. CP, 120 Broadway, New York 5, N.Y. When inquiring specify 4262 on form opposite last page.



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*Hills — McCanna (Saunders Patent)

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To obtain Chemical Safety Data Sheet SD-66, remit $0.30 direct to Manufacturing Chemists' Association, Inc., Dept. CP, 1625 Eye St., N. W., Washington 6, D. C.

Information on zirconium — current technical data

Increased use of zirconium and demand for technical data has prompted manufacturer to publish bi-monthly bulletin. First issue gives historical data and features story on zirconium production processes. Subsequent issues will deal with corrosion resistance, nuclear properties, physical and mechanical properties, analytical methods, and fabrication techniques.

"More Zr Facts" is issued by The Carborundum Metals Co., Div. of The Carborundum Co., Dept. CP, Akron, N.Y. When inquiring specify 4264 on form opposite last page.

Chromatography processes and equipment

Applications and descriptions of paper chromatography apparatus are covered in six-page bulletin. Electrochromatography process is explained and summary of operational features of equipment is included.

Brochure EC-301 is issued by Microchemical Specialties Co., Dept. CP, 1834 University Ave. Berkeley 3, Calif. Specify 4265 on form opposite last page.

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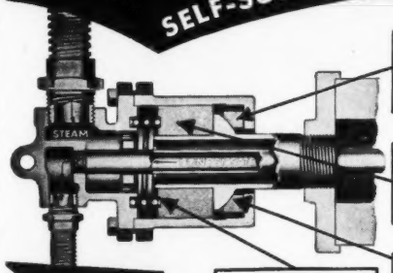
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Technical data on plastic pipe, fittings, and valves

Catalog of eight pages contains technical and descriptive data on plastic pipe, fittings, and valves. Tables list physical properties and chemical resistance of PVC, styrene-copolymer, and Buna N(acrylonitrile-butadiene). Sizes of fittings, sizes and types of valves, and dimensions and working pressures of pipe are detailed in tables and drawings.

Cat P101 is issued by Vanton Pump & Equipment Corp., Dept. CP, 201 Sweetland Ave., Hillside, N.J. When inquiring specify 4268 on form opposite last page.

Properties, preparation, uses of molybdenum disulfide

Uses of molybdenum disulfide as filler in nylon, phenolic laminates, Teflon, and other plastics, natural and synthetic rubber and asbestos, and as lubricant additive and catalyst are described in two bulletins. Preparation and properties of compound, as well as products, are outlined. List of 25 references to sources of more detailed information on compound and its properties and uses is included.

Buls Cdb-5 and Lu-12 are issued by Climax Molybdenum Co., Dept. CP, 500 Fifth Ave., New York 36, N.Y. When inquiring specify 4269 on form opposite last page.

"Next time tell him to send his centrifuge samples to the lab!"

Idea by Richard Nichols; drawing by Travis Pitchford. Both work in the Institute, W. Va., plant of Carbide and Carbon Chemicals Company.

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NEW LITERATURE

Bibliographical abstracts on synthetic detergents

Containing 311 abstracts, 44-page booklet has been prepared to fill need caused by increasing interest in analysis of synthetic detergents. References and abstracts are arranged chronologically from 1888 through 1955, with seven 1956 items listed. Complete subject and author indexes are included.

To obtain "Bibliographical Abstracts of Methods for Analysis of Synthetic Detergents" remit $1.50 direct to American Society for Testing Materials, Dept. CP, 1916 Race St., Philadelphia 3, Pa.

Electric-powered fork truck has low operator's seat

Specifications and dimensions of electric-powered fork truck, featuring operator's seat that is up to 18" lower than on conventional models, are covered in four-page bulletin. Photographs of various component parts show construction features.

Form 579 is issued by The Elwell-Parker Electric Co., Dept. CP, 4205 St. Clair Ave., Cleveland 3, Ohio. When inquiring specify 4271A on form opposite last page.

Chemical specialties analyses cataloged

Chemical specialty manufacturers who do not have facilities for making their own analyses can obtain catalog of reports available on over 1500 chemical specialties, such as cleaners, detergents, waxes, bleaches, polishes and many other items.

1957 catalog is issued by The Chemical Specialties Research Laboratories, Dept. CP, Box 33, Ansonia Station, New York 23, N.Y. Specify 4272 on form opposite last page.

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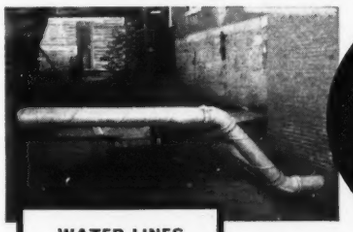
Specify NAYLOR PIPE and PIPE FITTINGS



TO SPEED THE JOB AND CUT COSTS

WATER LINES
AIR LINES
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COMPRESSED AIR LINES
VENTILATING LINES
PROCESS LINES
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Here is a lightweight pipe with extra strength and safety to handle jobs normally requiring heavier-wall pipe. Its exclusive spiral-lock construction acts as a continuous expansion joint—absorbs shock loads, stresses and strains. Sizes range from 4" to 30" in diameter. All types of fittings, fabrications and connections including one-piece Naylor Wedge-lock couplings to speed installation and cut costs. Available in steel, alloys and stainless steel.

Write for Bulletins No. 507 and No. 525

NAYLOR

Naylor Pipe Company
1260 East 92nd Street
Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office
60 East 42nd St.,
New York 17, N. Y.

When inquiring check 4274 opposite last page

measuring
space and
matter
in microns
to give
you better
SPRAY NOZZLES
The microscopic structure of a spray is a world of spherical bodies in motion with "wide" spaces in between. This is one of the levels of observation where our research engineers obtain important data for better spray nozzle design and performance.
For complete information, write for Catalog 24.
SPRAYING SYSTEMS CO.
3216 RANDOLPH • BELLWOOD, ILLINOIS
ADVANCED SPRAY NOZZLE DESIGN FOR NEW DIMENSIONS IN CONTROL AND PERFORMANCE

When inquiring check 4275 opposite last page

When inquiring check 4276 opposite last page

NEW LITERATURE

Answers to corrosion problems outlined in coating folder

How to obtain rust inhibition and chemical resistance in one-coat application is told in four-page folder on industrial maintenance paints. Other coatings to provide zinc shield; for painting cold rooms at freezing temperatures; and to give skid resistance on stairs, ramps, or floors are also cited.

Folder on industrial maintenance paints is issued by The Wilbur & Williams Co., Dept. CP, 130 Lincoln St., Boston 35, Mass. When inquiring specify 4277 on form which is located opposite last page.

Hydraulic pilot control for diaphragm valve

Spring-loaded, diaphragm-actuated hydraulic pilot designed for accurate control of diaphragm valves is described in two-page catalog sheet. Photographs and cutaway diagrams show features of equipment. Description, operation, recommended applications, and specifications are covered.

Cat sheet on hydraulic control pilot is issued by Atlas Valve Co., Dept. CP, 280 South St., Newark 5, N. J. When inquiring specify 4278 on form located opposite last page.

Sales-forecasting practices

Special report of 160 pages covers uses, techniques, and trends in sales forecasting. Feature of report is survey of sales-forecasting practices of nearly 300 companies.

To obtain Special Report 16, remit $3.75 ($2.50 for members) direct to American Management Association, Inc., Dept. CP, 1515 Broadway, Times Square, New York 36, N.Y.

RIDGID Jamproof 65R
Now Guarantees
Straight Threads Every Time
TC
OPEN
Every Ridgid Pipe Tool TESTED individually before shipment
Revolutionary new
TC (True-Centering) Workholder
centers all pipe, even over or under size
No more crooked threads! 65R pre-sets to size by turn of TC workholder gauge ring—tightens by palm-of-hand push on forged cam lever. All 3 jaws close together on pipe by one mechanical action.
Straight threads, drip threads if desired, jamproof, 1" to 2" with 1 set of dies, fast size change—only 65R offers you so much for your money. Buy it at your Supply House.
P.S. The new TC workholder fits your present 65R!
The Ridge Tool Company, Elyria, Ohio, U. S. A.
RIDGID
Work-Saver Pipe Tools

When inquiring check 4279 opposite last page

HOSE PROBLEMS?

You need this FLUOROFLEX®-T corrosion-proof hose

- **Handles virtually every fluid and gas from — 100°F to + 500°F**
- **Ageless — and stays flexible indefinitely**

SOLVE your really tough jobs for flexible hose with *Fluoroflex®-T hose assemblies* — the original Teflon hose now proved by over 3 years of demanding service.

With tube made from a patented, special compound of Teflon, the hose is completely inert to the most corrosive chemicals, active oils and fuels, gases, steam.

SAE 304 stainless steel braid reinforces for up to 1000 psi service (higher in some cases) and maintains this strength by its corrosion resistance.

Permanent, swaged fittings give positive protection against leakage and blowoff.

These lightweight, space-saving hose assemblies solve tough problems, increase reliability, cut replacement costs. Made by the originator of Teflon hose — and a company that makes its own Teflon tubing as well as the hose assemblies. For more data, write RESISTOFLEX CORP., Roseland, N. J.

®Teflon: DuPont trademark.
Fluoroflex: Resistoflex trademark.

RESISTOFLEX
CORPORATION • Roseland, N.J. • Western Plant: Burbank, Calif.
Southwestern Plant: Dallas, Tex.

When inquiring check 4280 opposite last page

NEW LITERATURE

Laboratory services pictured in booklet

Laboratory services in chemistry and other fields are reviewed in 12-page booklet. Facilities for serving industrial firms performing their own day-to-day laboratory work, as well as for those maintaining no facilities of their own, are cited.

"Serving Industry — Creative Research and Development Services" is issued by Rosner-Hixson Laboratories, Dept. CP, 7737 South Chicago Ave., Chicago 19, Ill. When inquiring specify 4281 on form opposite last page.

Tank truck carriers listed in directory

Necessary information on management personnel, terminal locations, general operating authorities, and regulations governing transportation of explosives and other dangerous materials is contained in tank truck carrier directory of over 100 pages. Information is listed in brief, easy-to-use form.

To obtain "National Tank Truck Carrier Directory" remit $5.00 direct to National Tank Truck Carriers, Inc., Dept. CP, 1424 Sixteenth St., N.W., Washington 6, D.C. When inquiring specify 4282 on form opposite last page.

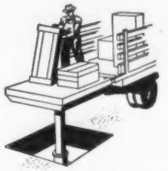
Data folder has 15 charts on two glycols

Diethylene and triethylene glycol are discussed in 16-page folder containing 15 charts showing physical properties.

Folder F-8085 is issued by Carbide and Carbon Chemicals Co., Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring specify 4283 on form opposite last page.

Lift it the low-cost way

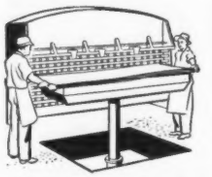
WITH DEPENDABLE HYDRAULIC POWER



Load trucks from floor level . . . no dock needed

Move traffic from one floor level to another

Rotary Levelator Lifts, using dependable, economical oil-hydraulic power, have countless applications in modern industry. Capacities to 100,000 lbs. Standard models and special lifts engineered to your specifications. Write for catalog.



Feed machines, perform other industrial lifting jobs

Rotary® Levelator® Lifts
ROTARY LIFT COMPANY
Division of the Dover Corporation
1021 Kansas, Memphis 2, Tenn. • Chatham, Ont.

When inquiring check 4284 opposite last page

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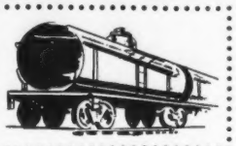
- **STAINLESS STEEL — OILLESS BEARINGS — STERILIZABLE**
- **POSITIVE DISPLACEMENT — SMOOTH, NON-PULSATING FLOW**
- **FOR HOT, COLD, VISCOUS OR WATERY FLUIDS**
- **ACCURATE WITHIN 1 TO 2%**

Maisch Metering Pumps are simple in design, ruggedly built for long service, and can be depended on to maintain accuracy indefinitely. Exclusive design features insure optimum performance. Particularly suited for handling chemicals, syrups, oils, glue, processing solutions, etc. Quick demountable or fixed heads. Fixed capacity pumps available in wide range of output. Pumps in stock for immediate delivery. Write for complete details and prices.

MECHANICAL PRODUCTS CORPORATION
176 North Ogden Avenue • Chicago 7, Illinois

When inquiring check 4285 opposite last page

Unusual phenolic coatings protect tanks and drums



Series B-124 Unichrome Phenolic Coatings offer reliable and durable lining for tank cars, storage tanks, and processing equipment.

Some coatings in this series deposit films twice as thick as ordinary phenolic coatings. One has a built-in "cure control." By *color*, it indicates the completeness of curing.

For rough and tumble service in drums, a Unichrome phenolic lining gives reverse impact resistance superior to ordinary phenolics.

Many companies who can give you fast service specialize in applying Unichrome Tank and Drum Linings. For name of one nearest you, contact Metal & Thermit. Also, send for Bulletin Chem-C-2.

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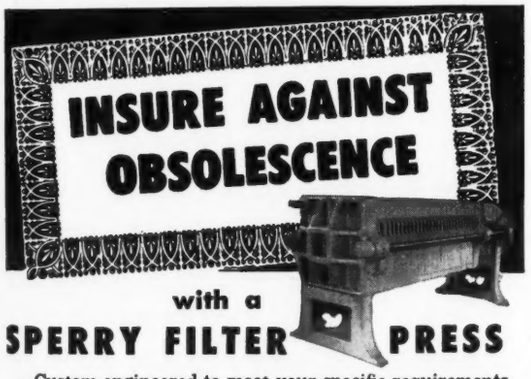
GENERAL OFFICES: RAHWAY, NEW JERSEY
Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles
In Canada: Metal & Thermit—United Chromium of Canada, Limited. Rexdale, Ont.

When inquiring check 4286 opposite last page



—Custom engineered to meet your specific requirements. Exact capacity . . . uniform product purity and stability.
—Ruggedly built to provide many years of trouble-free service. Minimum wear. Low maintenance.
—Adaptable for conversion to any type of filtration operation should changes in your product or process ever become necessary.
Sperry Filter Presses are available in a wide variety of materials and capacities. Write today for the complete catalog.

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☐ Send Free Sperry Catalog
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When inquiring check 4287 opposite last page

NEW LITERATURE

Bibliography on separation of rare earths in steel

Covering technical literature on separation of total rare earths in low-alloy constructional steels, 157-page bibliography contains 638 references, with abstracts, dating back to 1940. Selections refer to chemical methods of separation, fractionation, and determination. Studies of chemical and physical properties of rare earths and rare-earth compounds also are included.

To obtain PB 121337, "Methods of Separation of Total Rare Earths in Low-Alloy Constructional Steels" remit $4.00 direct to Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C.

Nameplate marking machine compact, safe-operating

Bul of two pages describes features and operation of nameplate marking machine designed for production marking of constant and changeable data on panels of pre-formed nameplates. Specifications and illustrations of equipment are included.

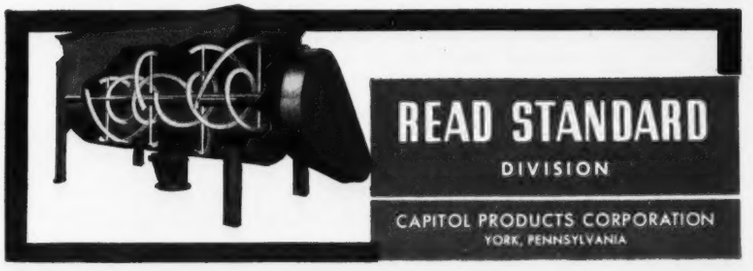
Bul 146-C17 is issued by Jas. H. Matthews & Co., Dept. CP, 3942 Forbes St., Pittsburgh 13, Pa. When inquiring specify 4288 on form opp. last page.

Automatic shut-off equipment described in bulletin

Equipment that automatically shuts off engine when oil pressure drops to dangerously low level — or when engine temperature rises to dangerously high level — is outlined in two-page bulletin. Components are listed and described.

Form 18-705 is issued by Stewart-Warner Corp., Dept. CP, 1826 Diversey Pkwy., Chicago 14, Ill. When inquiring specify 4289 on form opposite last page.

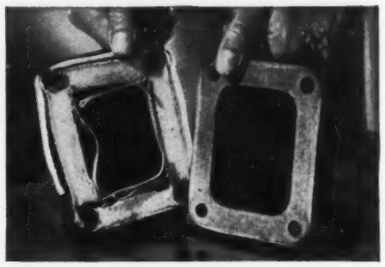
Whether you are mixing granular or pulverized, wet or dry materials, Readco's counterflow action spiral ribbon mixers will provide a thorough mix in less time and without material build-up at the bowl ends. These sturdy mixers are built for continuous or batch processing. They can be supplied for pressure of vacuum service, with or without temperature controlling jackets and in working capacities from 1 to 500 cubic feet. Readco also manufactures a complete line of double arm mixers, including laboratory and pilot plant models, vertical mixers and materials handling equipment. Modern laboratory facilities are available to assist you in determining the proper equipment to suit your needs. Write for complete details.



When inquiring check 4290 opposite last page

IS NOT ATTACKED BY FUMING NITRIC ACID

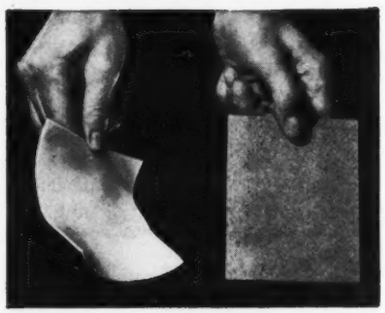
Reinforced Teflon (DUROID 5600) showed no sign of attack after 48-hour immersion in Type IIIA fuming nitric acid at 80°F.



DOES NOT COLD FLOW UNDER PRESSURE

Reinforced Teflon (DUROID 5600) at right resisted torque and flange pressure that caused extrusion of Teflon.

REINFORCED TEFLON*
(DUROID 5600)
INDICATED FOR CRITICAL GASKET USE



GREATER RESISTANCE TO HEAT DISTORTION

Teflon (left) distorted badly when subjected to 720°F. and then cooled. Reinforced Teflon (DUROID 5600) retained flatness.

Rogers makes several grades of reinforced Teflon under the designation DUROID 5600 series. One of these grades may be just the material you need for a critical gasket application. Please write Dept. C for technical data.

*Registered trademark of DuPont Company for its tetrafluoroethylene resin.

ROGERS CORPORATION ROGERS CONNECTICUT

DUROIDS • SHOE MATERIALS • ELECTRICAL INSULATION • PLASTICS • RUBBER • FABRICATING • DEVELOPMENT

When inquiring check 4291 opposite last page

NEW LITERATURE

Reactor power upped 50% with tubular fuel elements

Bulletin of 10 pages describes tubular aluminum and stainless steel nuclear fuel elements capable of increasing reactor operating power by as much as 50 percent. Background information on development of fuel elements is provided. Drawings and photographs show tubes, bundle assembly, core assembly, and unit in reactor.

MND-1051 is issued by Nuclear Div., The Martin Co., Dept. CP, Baltimore 3, Md. When inquiring specify 4292 on form which is located opposite last page.

Bulletin helps in selecting data reduction system

With aid of block diagram, two page bulletin describes various combinations of accessories and output equipment which can be used with manufacturer's semi-automatic analog-digital converter to achieve data reduction system best suited to individual user's problem.

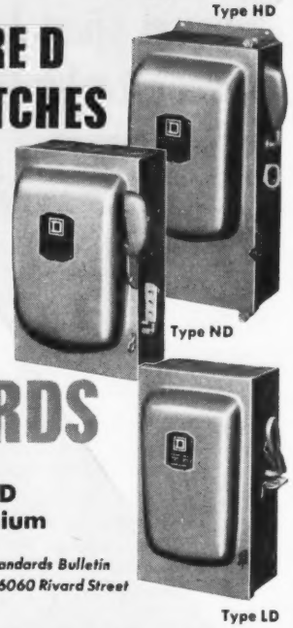
Bul CR-187 is issued by Coleman Engineering Co., Inc., Dept. CP, 6040 W. Jefferson Blvd., Los Angeles 16, Calif. When inquiring specify 4293 on form opposite last page.

Water-soluble colloid data

Four grades of water-soluble colloids are described in four-page folder. These powdered hydrophylic colloids are made from seeds of certonia, silique, cyamopsis tetragonoloba, and other leguminous seeds and are used as thickeners and binders.

"Burtonite, Series 7," is issued by The Burtonite Co., Dept. CP, Nutley 10, N.J. When inquiring specify 4294 on the convenient form which is located opposite last page.

GET SQUARE D SAFETY SWITCHES
and benefit from the
NEW NEMA STANDARDS



Types HD, ND, LD at no cost premium

Write for New NEMA Standards Bulletin
Address Square D Company, 6060 Rivard Street
Detroit 11, Michigan

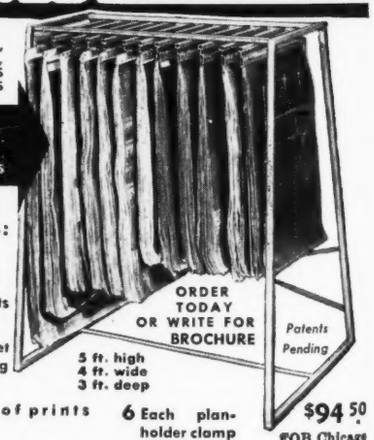
NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE
SQUARE D COMPANY

When inquiring check 4295 opposite last page

Glider BLUE PRINT RACK

FOR ARCHITECTS, ENGINEERS, CONTRACTORS & FACTORIES

NOW EASY TO FILE... EASY TO FIND... YOUR BLUE PRINTS



20 Exclusive Features: including:

1 No holes to punch.
2 Insert sets of prints easily.
3 Replace any sheet without removing other sheets.
4 Various sizes of prints accommodated.
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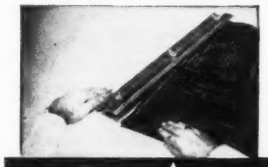
6 Each plan-holder clamp holds from 1 to 100 prints.
7 The "Glider" can hold 12 to 18 sets.
8 Clearly visible index shows location of sets.
9 No bolts that scratch furniture.
10 Easily adjustable tracks allow for varying thicknesses of sets.

$94.50 FOB Chicago including 12 plan holders



MOMAR INDUSTRIES
4323 West 32nd Street • Chicago 23, Illinois • LAfayette 3-1633

When inquiring check 4296 opposite last page

Here's the economics of design for asbestos insulation

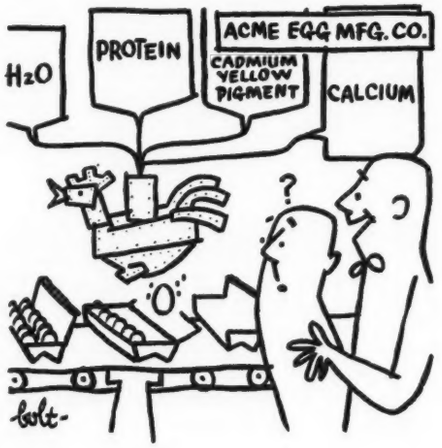
Not only are technical, manufacturing, and installation data included on this long-fiber asbestos pipe insulation, but about half of book's 40 pages are devoted to the economics of specifying thickness of insulation. Pipe temperatures from 200 to 1200°F, and insulation thicknesses from 1 to 5 inches are covered.

"Unibestos Insulation" is issued by Union Asbestos & Rubber Co., Dept. CP, 1111 W. Perry St., Bloomington, Ill. When inquiring check 4297 on form opposite last page.

Wall chart lists do's & don't's in handling sulfuric acid

Up-to-date instructions for safe unloading and handling of sulfuric acid are presented in 17 x 22" wall chart. Chart is printed in two colors on moisture-resistant paper. It describes proper methods for pump and air unloading of tank cars, with emphasis on cold weather procedure.

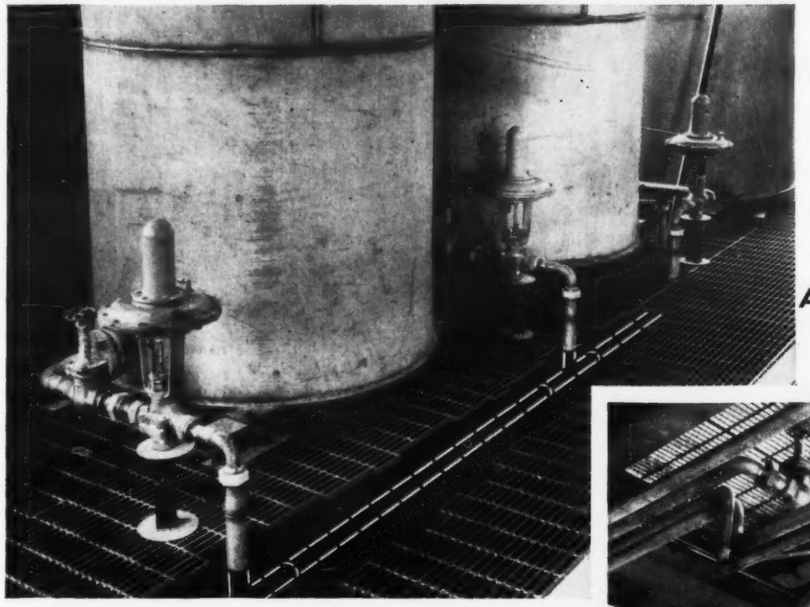
Safety wall chart is issued by Industrial Chemicals Division, Olin Mathieson Chemical Corp., Dept. CP, Baltimore 3, Md. When inquiring specify 4298 on form opposite last page.



"No . . . we haven't been able to patent it. Something about the existence of prior art."

Idea man: Fred Kisbany, American Tape Co., Port Huron, Mich.

ENGINEERS SELECT
SPEEDLINE FITTINGS
FOR COMPLEX STAINLESS STEEL PIPING SYSTEM



...TO PRODUCE ACROSS THE BOARD
SAVINGS
AT AMERICAN ALCOLAC CORPORATION

Speedline Fittings (tees, ells, reducers, etc.) cut costs, eliminated solvent leakage and provided greater line flexibility.

Piping extending through and running beneath the floor grating can be loosened and removed for alteration or repair, if required. This is important in an inflammable area at American Alcolac Corporation's Baltimore plant, where pipe welding must be done *outside* the plant now that process operations are underway. It's one of the assembly advantages which American Alcolac Corporation in conjunction with Marcus Sittenfield & Associates, consulting engineers, recognized in SPEEDLINE unions . . . and one of the reasons they specified SPEEDLINE Fittings for the plant's complete process piping system.

SPEEDLINE FITTINGS CUT COSTS and simplified installation across the board. Because SPEEDLINE unions, ells, tees, aligning connectors and reducers are designed especially for use with light wall pipe. Economical Schedule 5 stainless pipe was used to minimize materials costs . . . yet maintain high degree of process purity. Labor time and costs were reduced, too, because SPEEDLINE Fittings' exclusive "Tangential Feature"— an extra straight section on *every* end of *every* formed fitting—permits free choice of joining method to effect easier, faster assembly . . . even in constricted areas.

FACED WITH A PROCESS PIPING PROBLEM? Whatever your particular requirements, it will pay you to investigate the advantages of SPEEDLINE Fittings *first*. Write for a copy of "SPEEDLINE CATALOG" at no obligation . . . or contact your nearest SPEEDLINE distributor.

703

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SPEEDLINE IS A REG. T.M. OF HORACE T. POTTS COMPANY

STAINLESS STEEL FITTINGS
THE NEWEST THING IN PIPELINE ECONOMY
SPEEDLINE DISTRIBUTORS ARE LOCATED IN PRINCIPAL CITIES FROM COAST TO COAST

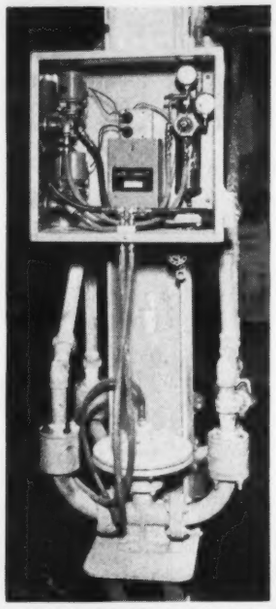
Manufactured by **HORACE T. POTTS COMPANY** • 502 E. Erie Avenue • Philadelphia 34, Penna.

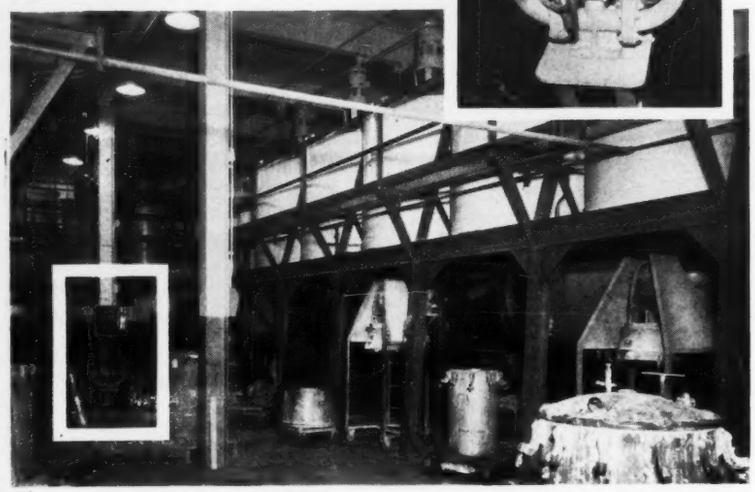
When inquiring check 4299 opposite last page

How Binks Pumps Paint...

OLIVER DIAPHRAGM SLURRY PUMPS

in Ceramic Circulating System for Hotpoint





Handling an abrasive ceramic paint, O.D.S. Pumps, incorporated in the Binks Ceramic Circulating System for multiple spray stations, developed by the Binks Manufacturing Company, Chicago, Illinois, are helping to provide a higher quality product at lower cost in Hotpoint's Range and Refrigerator Enameling Department in Chicago.

Capable of handling materials ranging from clear liquid to slurries containing up to 60% abrasive solids, the O.D.S. is designed to meet "problem pumping" specifications inherent in applications such as Binks'.

With the diaphragm receiving its impulse pneumatically rather than mechanically, there is *no stuffing box* thus *no leakage* . . . this link free simplicity can readily be interpreted in terms of reduced maintenance and operating costs. Since maintenance is a prime factor in pumps, why not investigate now all the details of the O.D.S. Pump?

In writing for your free copy of Bulletin No. 5003, tell us about your pumping problem. Dorr-Oliver Incorporated, Stamford, Connecticut.

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INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

When inquiring check 4300 opposite last page

NEW LITERATURE

Device automatically feeds correct tape length

Data sheet describes and illustrates device which automatically feeds correct tape length for taped-top boxes. Unit reportedly affects considerable savings in labor and time wherever mixed size cartons are handled in volume.

"Automation in Tape-Measuring" is issued by Better Packages, Inc., Dept. CP, Shelton, Conn. When inquiring specify 4301 on form which is located opposite last page.

Laboratory equipment book features lighter side

Manufacturer's 24-page book on laboratory equipment features lighter side with article on showmanship antics of 19th Century scientists. Quaint contemporary cartoons and prints illustrate article. Laboratory ovens, incubators, centrifuges, and reagents are described and illustrated in another section of the issue.

Vol. 25, No. 5 of "The Laboratory" is issued by Fisher Scientific Co., Dept. CP, 303 Fisher Bldg., Pittsburgh 19, Pa. When inquiring specify 4302 opposite last page.

Lists radioactive chemicals and technical services

Manufacturer's 24-page catalog and price list covers radioactive chemicals and devices employing radioactive sources. Analytical services for assay of carbon-14, hydrogen-3, and sulfur-35 are explained. Consulting services are also discussed.

Cat and price list is issued by New England Nuclear Corp., Dept. CP, 575 Albany St., Boston 18, Mass. When inquiring reader may simply specify 4303 on the form which is located opposite last page.

MORSE DeLUXE 500 Portable ROTATOR

- MIXES
- BLENDS
- TUMBLES
- CLEANSES

Faster and at less cost!

The patented Morse De Luxe 500 Rotator will handle 1 to 55 gal. containers, weighing to 500 lb. They revolve safely, smoothly, efficiently at 10, 20, 40 rpm on this powerful, compact, portable, motorized unit. Cuts cost of mixing, blending, tumbling, cleansing. Easily moved and loaded by one man. Has ¾" dia. power driveshaft with self-aligning ball bearings. Four adjustable 4" dia. Neoprene-tread drive wheels. Fully enclosed worm-gear drive with 30-1, 15-1, 7½-1 reductions. Weighs 137 lb. Delivered complete with motor, drive mechanism and tipping lever. Write for Bul. #1053 and catalog, showing full Morse line of Drum and Barrel handling equipment.

MORSE *MANUFACTURING CO. INC.*
757 West Manlius St. East Syracuse, N. Y.

When inquiring check 4304 opposite last page

HERE'S THE MOST COMPLETE NOZZLE CATALOG EVER PUBLISHED

Whatever your nozzle problem, look first in this new catalog by Spraco. Here is complete information on a wide range of nozzle types and sizes as well as general spraying coverage data.

Send for your **FREE** *copy today . . .*

SPRAY *Engineering Company*
125 Central Street, Somerville 45, Mass.

When inquiring check 4305 opposite last page

Chart lists liquid plastic coatings to meet variety of conditions

An aid to corrosion engineers in selection of proper plastic coating is provided by chart which recommends liquid plastic coatings for a variety of conditions. Chart contains comprehensive listing of architectural, industrial, and marine applications. Supplemental chart sets forth comparative performance under various conditions, application methods, costs, and other pertinent data of individual plastic coatings. Proper surface preparations and primers to be used in each instance are also shown. In most cases, a number of plastic coatings are recommended to provide diversification of finishes to suit all requirements.

Universal Pro-Coat Chart and supplement are issued by Protective Coatings, Inc., Dept. CP, 807 N. Fremont Ave., PO Box 2578, Tampa 1, Fla. When inquiring specify 4306 on form opposite last page.

Tells how forests increased by 250% through use of fertilizer

Practice of fertilizing forests to increase wood production is considerably more advanced in West Germany than in the United States. Report of 112 pages tells how increased nursery yields of 100 to 400%, and increased yields of forest trees by 150 to 250% were achieved through use of fertilizer and novel methods of application.

To obtain "The Use of Commercial Fertilizers, Particularly Nitrogen, in Forestry" write direct to Dr. E. D. Crittenden, Nitrogen Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N.Y. When inquiring specify 4307 on the convenient Reader Service slip which is located opposite last page.

Fork, handlift, platform trucks — they're all described here

Complete line of company's trucks is listed in bound 132-page catalog containing facts and figures, description of features, and "on-the-spot" photographs. Some of the described models include electric fork trucks, stackers, pallet and platform trucks, handlift trucks, skid trucks. Other items include skids, portable cranes, drum and pallet racks, and drum and barrel trucks.

132-page catalog is issued by Lewis-Shepard Products, Inc., Dept. CP, Watertown, Mass. When inquiring specify 4308 on form opposite last page.

60 YEARS OF SPECIALIZATION MAKES

Moline *chain*

best by any job test

MOLINE makes just one thing—the world's finest malleable chain. The superiority of this chain has been established by 60 years of specialization. Moline engineers and technicians confine their efforts to improving design and refining manufacturing techniques—to produce chain that will give maximum efficiency . . . trouble-free performance . . . long life. And only Moline chain is triple-tested. That means Moline chains undergo rigid physical testing, visual inspection and gauging by experts. Then, after assembly, they are stressed to proof strength and shock tested for soundness. Be sure to *specify Moline Chain*, malleable or promal, for conveying, elevating and power transmission services. Write today for catalog.

When inquiring check 4309 opposite last page

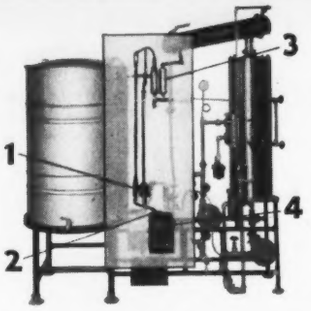
What is Your DISTILLED WATER PROBLEM?

Whatever it is — let Barnstead's many years of experience in Engineering skill go to work for you.

If you require distilled water at low cost . . . water that is free of minerals, non-ionizable impurities including silica, organic matter, and bacteria . . . Barnstead can help you.

With over 200 sizes and models to choose from, Barnstead can "match" the still to your problem, whether you need ½ or 1000 gallons per hour. Designed for use with steam, gas or electricity as heat. Barnstead also supplies tin-lined tanks, tin-lined piping, and automatic controls described here.

Write for Catalog "G" Today



Another example of Barnstead engineering versatility is the Still with Puromatic Controller. Automatically tests each drop of distillate, permitting only distilled water of a preset purity to enter storage tank. 1. Automatic Valve Diverter. 2. Light alarm. 3. Sampling chamber with conductivity cell. 4. Controller type purity meter with Automatic temperature compensation.

Pure Water Specialists Since 1878

Barnstead
STILL & DEMINERALIZER CO.

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When inquiring check 4310 opposite last page

JELLIFF *in Mesh with Industry . . .*

Wire Mesh

Specializing in the non-ferrous metals in counts to 200 x 200 or 50 x 750 and widths up to 48" in all commercial weaves

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WIRE PRODUCTS SINCE - 1860

THE C. O. JELLIFF MANUFACTURING CORP.
SOUTHPORT • CONNECTICUT • USA

When inquiring check 4311 opposite last page

NEW LITERATURE

Equipment for weighing free-flowing materials

Features of scales and feeders for weighing and feeding free-flowing bulk materials are described in 16-page well-illustrated bulletin. Dimensions and specifications are presented in drawings and tables. Lists of typical uses and types of materials handled are included.

Bul 100 is issued by ABC's Scale Div., McDowell Co., Inc., Dept. CP, 16300 Waterloo Rd., Cleveland 10, Ohio. . . . or for more information specify 4312 on form which is located opposite last page.

Gives industrial lift trucks smoother, faster ride

Bulletin of four pages describes shock absorbers for industrial lift trucks designed to provide smoother, faster, more efficient operation. Typical shock absorber installation is shown and its operation explained. Cutaway drawing shows construction of unit.

Bul on shock absorber is issued by Towmotor Corp., Dept. CP, 1226 E. 152nd St., Cleveland 10, Ohio. When inquiring specify 4313 on form which is located opposite last page.

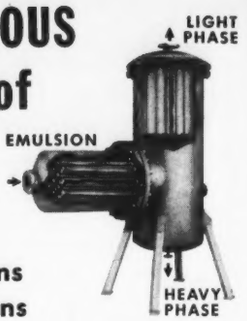
Research and development organization discussed

Detailed study of Product Planning and Market Analysis Div. of International Business Machines Corp. is featured in 50-page report on organizing research function for profit. Report explains coordination of product planning with other functions of corporation.

To obtain Research and Development Series 1, remit $1.75 ($1.00 for members) direct to American Management Association, Inc., Dept. CP, 1515 Broadway, Times Square, New York 36, N. Y.

FOR CONTINUOUS SEPARATION of EMULSIONS in

- steam distillations
- solvent extractions
- organic reactions



SELAS LIQUID SEPARATOR

Selas Liquid Separators offer a simple, efficient, rapid method of separating stubborn, unstable emulsions of immiscible liquids on a continuous basis. In addition, they are well-suited for the recovery of costly organic materials and for the dewatering of solvents and organic liquids.

High flow rates, coupled with low pressure drop, enable considerable reduction in energy requirements and equipment space. Simple, compact design provides for in-line installation on production systems. Contain no moving parts . . . require minimum maintenance.

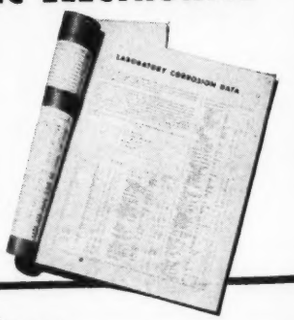
Send for informative literature describing in more detail the Selas method of liquid-liquid separation. Address Dept. 116.

SELAS CORPORATION OF AMERICA
Heat and Fluid Processing Engineers
DRESHER, PENNSYLVANIA

When inquiring check 4314 opposite last page

Complete Data on Corrosion Resistance of REPUBLIC ELECTRUNITE®

STAINLESS STEEL TUBING AND PIPE appears in NEW 60-PAGE BROCHURE



PLUS information on

- Applications
- Design Recommendations
- Fabricating Data
- Engineering Data
- Analyses
- Specifications

Send for your free copy today!

REPUBLIC STEEL
STEEL AND TUBES DIVISION
207 East 131st Street • Cleveland 8, Ohio

When inquiring check 4315 opposite last page

Here's catalog, file folder on urethane polymers

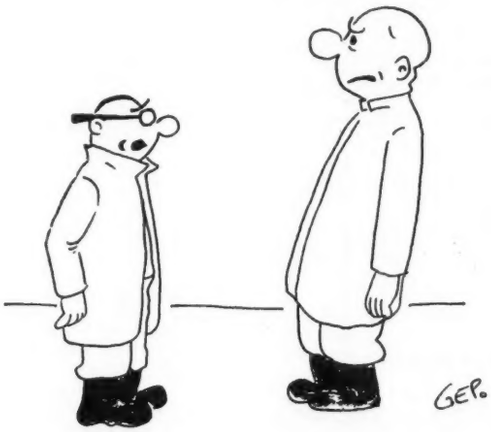
Combination catalog and file folder on urethane polymers, contained in 9 x 12 brochure, can be easily kept up to date. File section has eight pages of information on two-liquid component formulations. As additional data are released, they can be added to file. Booklet explains how custom formulations are created. It also covers in-plant applications, electrical properties, bonding and adhesion, impact absorption, and strength properties.

Catalog-file is issued by Dayton Rubber Co., Dept. CP, Dayton 1, Ohio. When inquiring specify 4317 on form opposite last page.

Tells preparation, properties of epoxy plasticizers

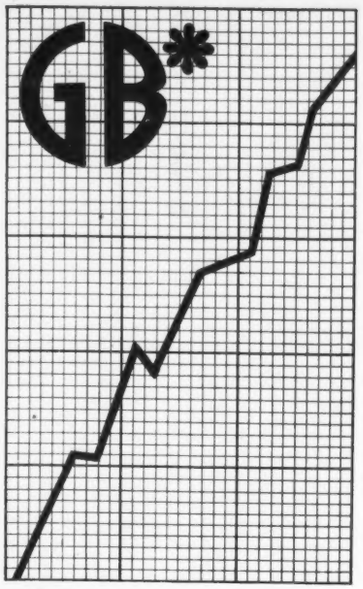
Methods of preparation and individual properties of several epoxy fatty acid ester plasticizers are described in eight-page bulletin. Plasticizers can be prepared from unsaturated fatty acid esters by epoxidation reactions, using either a preformed peracid such as peracetic acid, or an in-situ technique.

Bul 80 is issued by Becco Chemical Div., Food Machinery and Chemical Corp., Buffalo 7, N.Y. Specify 4318 opposite last page.



"The comrade is no longer with us. He was advocating the existence of the free radical."

Thanks to George E. Pekarek, The Glidden Company, Cleveland



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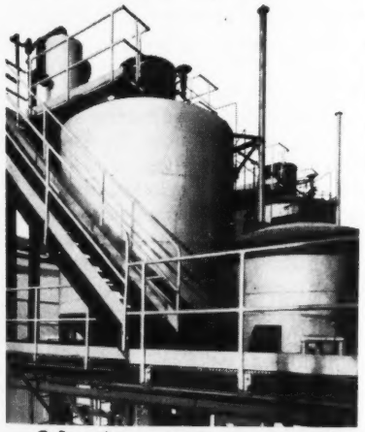
For over half a century Good Business has been represented by Goslin-Birmingham, offering world wide service to users of mechanical and heat transfer equipment, including custom designing and foundry service.



G-B engineers are at your service at any time to discuss your processing problems.

GB GOSLIN-BIRMINGHAM MANUFACTURING CO., INC.
BIRMINGHAM, ALABAMA

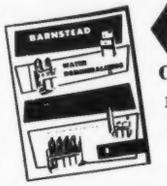
When inquiring check 4316 opposite last page

What is Your DEMINERALIZED WATER PROBLEM?

This 30 gallon per hour, four-bed demineralizer has exceptional purifying capacity — provides a longer operating cycle before regeneration becomes necessary.

Above . . . Model FR-1, four-bed demineralizer. Flow rate 30 gph. Stainless steel encased. Requires only 28" x 24" x 56" floor space. Completely assembled. Requires only water, drain, and low-voltage electrical connection. Ideal for raw water of high mineral content since it will produce about 3 times the quantity of demineralized water per operating cycle as corresponding two-bed models.

There are thousands of uses for low-cost demineralized water in industry . . . and for all of these applications Barnstead Demineralizers can be used profitably, to reduce rejects, increase production, and insure better product results. Barnstead Demineralizers have capacities from ½ to 500 gallons per hour and feature single-bed, mixed-bed, two-bed, and four-bed models . . . a demineralizer for every need.



NEW!
CATALOG 127-A
Describes Barnstead's complete line of demineralizers. Gives specifications . . . case histories.

Pure Water Since 1878

Barnstead STILL & DEMINERALIZER CO.
66 Lanesville Terrace, Boston 31, Mass.

When inquiring check 4319 opposite last page

GOT A SEPARATION PROBLEM?

READ THIS BOOKLET
LEARN HOW TO SEPARATE

- ✓ OIL AND LIGHTENDS FROM GAS
- ✓ CARRYOVER FROM VESSELS
- ✓ COMPRESSOR OIL AND CONDENSATE FROM GAS & VAPOR
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If you have one of the above separation problems, write for Anderson's free purification booklet. Here you'll learn the most efficient method yet developed for separating mist, liquid, or particles from any gas or vapor. Anderson's purifiers, scrubbers, and mist extractors are absolutely maintenance free. There are no moving parts, filters or screens that require servicing. Results are guaranteed. Outline your problem to us today.

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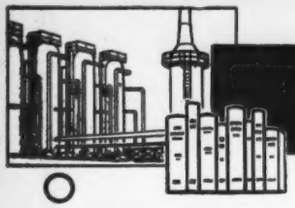
When inquiring check 4320 opposite last page



processing and engineering data

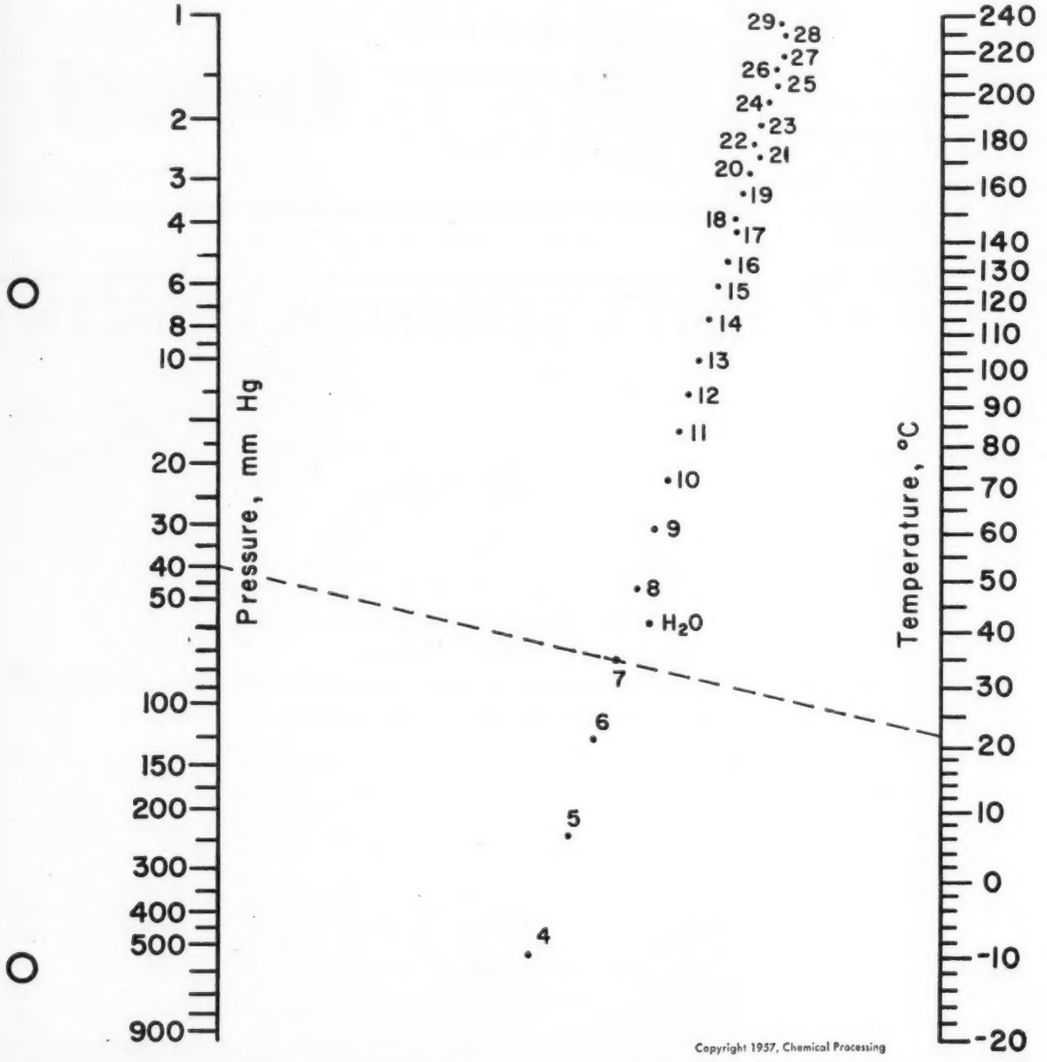
200

Vapor Pressures of Normal Alkanes

JOHN B. GARDNER
120 Holly, Lake Jackson, Texas

Broken index line on accompanying nomograph shows that the vapor pressure of n-heptane is 40 millimeters of mercury at 22°C. (Points refer to number of carbon atoms for normal alkane series.)

Chart agrees well with tables on pages 153-165 of third edition of Perry's "Chemical Engineers' Handbook," McGraw-Hill Book Co., Inc., New York, 1950.



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REPLACE VALVE SEATS IN SECONDS

Save Money, Down Time and Maintenance

The man in the photo above is actually replacing seating surfaces on a Rockwell-Nordstrom valve while the valve *is in service.* Usually, when a valve seat wears slightly it means down time for repairs and replacement. Rockwell-Nordstrom lubricated plug valves eliminate this cost because the seating surface between plug and body is a film of *pressurized lubricant.* Each time the valve is lubricated, the seat renews itself. And unlike ordinary metal seats, the tough plastic lubricant resists cutting or corrosion even on "hard to handle" services. Lubricant saves further by reducing wear for longer valve life at lower cost.

Available in a *complete* line of sizes and pressures. Rockwell-Nordstrom valves cost no more to buy—often less—than ordinary valves. Write for complete details. Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited.

ROCKWELL-Nordstrom VALVES
Lubricant Sealed For Positive Shut-Off

When inquiring check 4321 opposite last page

Wanted: Nomographs!

Each could earn $20!

Do you have a pet nomograph that could save time for other CHEMICAL PROCESSING readers? Send it to:

DATA EDITOR
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

CHEMICAL PROCESSING pays $20 for each one accepted and published.

Manual details information on aluminum insulation

Illustrated 40-page manual gives detailed information on aluminum insulation jacketing for tanks, vessels, and piping systems of chemical and other process industries. Basic engineering data are presented to help in evaluating essential design information.

"Kaiser Aluminum Insulation Jacketing Materials and Methods" is issued by Kaiser Aluminum & Chemical Corp., Dept. CP, Kaiser Bldg., 1924 Broadway, Oakland 12, Calif. When inquiring specify 4322 on form opposite last page.

Dimethylhydantoin bibliography

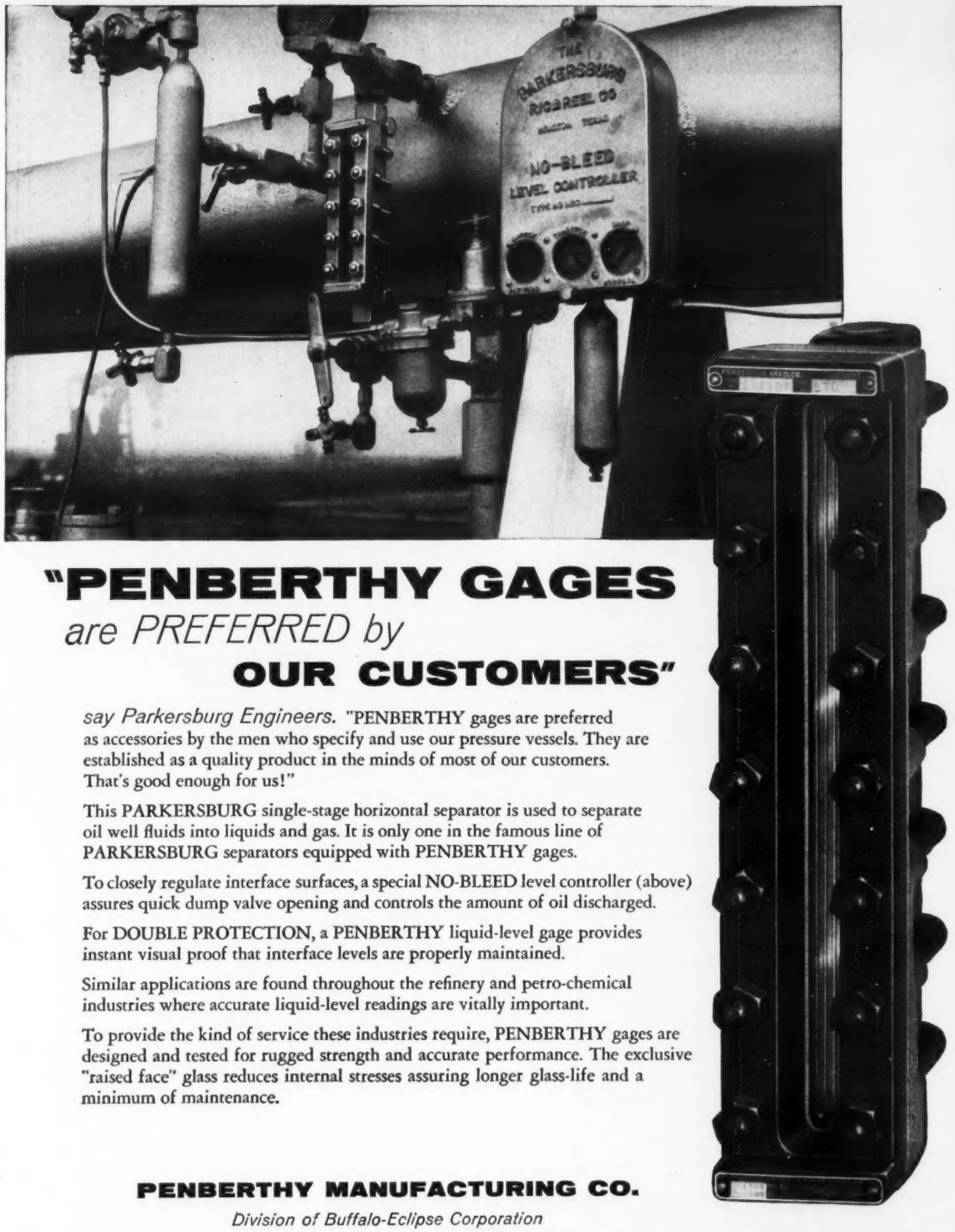
Physical properties and chemical reactions of dimethylhydantoin (DMH) and derivatives are given in six-page bibliography, punched for insertion in looseleaf binder. Reactions with mineral acids, alkalis, acetic anhydride, methylating agents, chlorine, formaldehyde and noble metal salts are included. 35 DMH and 41 derivative references are listed.

DMH bibliography is issued by Glyco Products Co., Inc., Dept. CP, Empire State Bldg., New York 1, N.Y. When inquiring specify 4323 on the convenient Reader Service slip which is located opposite last page.

Describes fork lift truck with added features

Specifications and outlined description on company's fork trucks are contained in four-page brochure. New features include increased power for faster operation, additional optional job attachments, and LP-gas optional power.

Form 1504 is issued by Hyster Co., Dept. CP, 2902 NE Clackamas St., Portland 8, Ore. When inquiring specify 4324 on form opp. last page.



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are PREFERRED by
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say Parkersburg Engineers. "PENBERTHY gages are preferred as accessories by the men who specify and use our pressure vessels. They are established as a quality product in the minds of most of our customers. That's good enough for us!"

This PARKERSBURG single-stage horizontal separator is used to separate oil well fluids into liquids and gas. It is only one in the famous line of PARKERSBURG separators equipped with PENBERTHY gages.

To closely regulate interface surfaces, a special NO-BLEED level controller (above) assures quick dump valve opening and controls the amount of oil discharged.

For DOUBLE PROTECTION, a PENBERTHY liquid-level gage provides instant visual proof that interface levels are properly maintained.

Similar applications are found throughout the refinery and petro-chemical industries where accurate liquid-level readings are vitally important.

To provide the kind of service these industries require, PENBERTHY gages are designed and tested for rugged strength and accurate performance. The exclusive "raised face" glass reduces internal stresses assuring longer glass-life and a minimum of maintenance.

PENBERTHY MANUFACTURING CO.
Division of Buffalo-Eclipse Corporation
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***There's Certain Satisfaction in* PRODUCTS BY** PENBERTHY

- EJECTORS
- INJECTORS
- CYCLING JET PUMPS
- ELECTRIC SUMP PUMPS
- LIQUID LEVEL GAGES
- GAGE VALVES

When inquiring check 4325 opposite last page

Heat Transfer by Convection From Various Surfaces

E. I. SHROFF
Buena Park, California

This nomograph offers a convenient means of solving for the coefficient of heat transfer by natural convection (conduction and convection) from outer surfaces of horizontal and vertical pipes and plates to air at atmospheric pressure and ordinary temperatures.

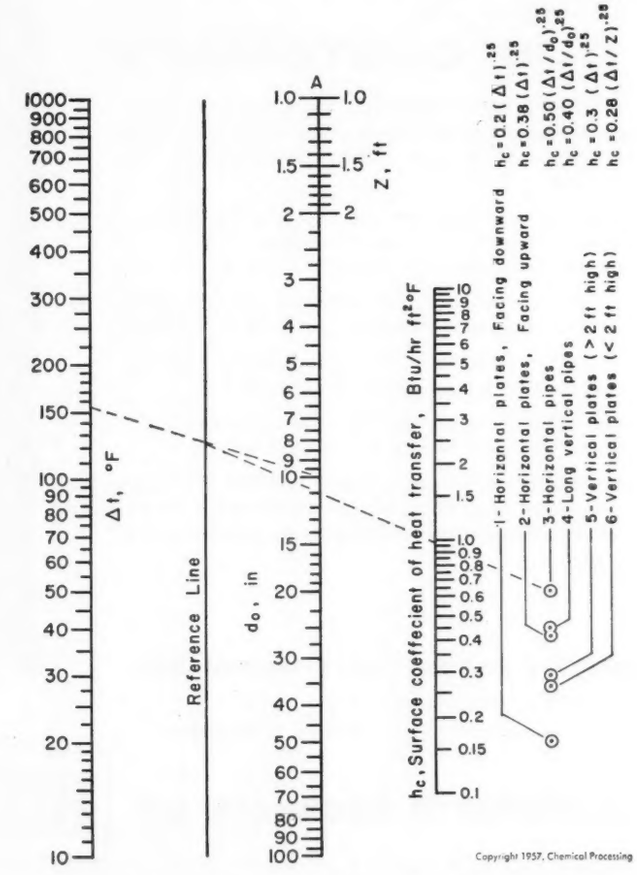
Typical Example

For solving Equations 1, 2, and 5 (see accompanying chart), connect the value of Δ t, temperature potential in °F, with point A on the d_o (diameter, in inches) scale to intersect the reference scale. From this point draw a line to the corresponding circled reference point for the equation and read desired value of the surface coefficient of heat transfer, in Btu/hr sq ft (°F) at intersection with h_c-scale.

For solving Equations 3, 4, and 6, draw a line from Δ t to d_a or to Z, the height of plate in ft, to intersect reference line. Connect this point with corresponding circled reference point for the equation and read desired coefficient at intersection with h_c-scale.

LITERATURE REFERENCE

Equations 1, 2, 3, and 6 appear on p. 474 of Perry's "Chemical Engineers' Handbook," 3rd edition, McGraw-Hill Book Co., Inc., New York, N.Y., (1950).


A
Δt, °F
Reference Line
d_o, in
Z, ft
h_c, Surface coeffecient of heat transfer, Btu/hr ft²°F
1- Horizontal plates, Facing downward $h_c = 0.2(\Delta t)^{.25}$
2- Horizontal plates, Facing upward $h_c = 0.38(\Delta t)^{.25}$
3- Horizontal pipes $h_c = 0.50(\Delta t/d_o)^{.25}$
4- Long vertical pipes $h_c = 0.40(\Delta t/d_o)^{.25}$
5- Vertical plates (>2 ft high) $h_c = 0.3(\Delta t)^{.25}$
6- Vertical plates (<2 ft high) $h_c = 0.28(\Delta t/Z)^{.25}$
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SKY-BLAST®
moves more air at less cost

...powerful roof ventilator with
NEW Smoke-Trip® Damper Opener

Because Propellair Sky Blast roof ventilators do not need the usual restricting weather cover which deflects and reduces air movement, they move more air at less cost. Fumes and heat are thrown high into the air, can't re-enter windows or turn downward to create roof maintenance problems. Their efficiency is not effected by wind velocity or direction. Weatherproof dampers open automatically when fan is started. Hot-dip galvanized after fabrication, Propellair Sky Blast ventilators are ruggedly built to give years of maintenance-free service. Available in sizes from 16" to 60" for 2820 to 78,800 CFM—PFMA Certified Ratings.
If desired, exclusive new Smoke-Trip heat-actuated venting device which automatically opens dampers in case of fire to exhaust smoke and fumes is available.

WRITE FOR BULLETIN NO. 680-C

R&M PROPELLAIR®
DIV. OF ROBBINS AND MYERS, INC.
SPRINGFIELD, OHIO
Certified Ratings PFMA

MAN COOLER VANEAXIAL TUBEAXIAL EXTENDED SHAFT

MOVING AIR IS OUR BUSINESS

When inquiring check 4326 opposite last page

NOMOGRAMANIACS AND CARTOONISTS —

WHEN YOU submit cartoons and nomographs to CHEMICAL PROCESSING for consideration, please be sure that your return address is complete and correct. It's impossible to mail your acceptance check or to return unaccepted work if the address isn't right.

As a matter of fact, we are now holding some checks for contributors whose addresses we don't have. If you've seen your work in CHEMICAL PROCESSING, or if you haven't heard from us for a reasonable length of time, drop a note to Data Editor, CHEMICAL PROCESSING, 111 E. Delaware Pl., Chicago 11, Ill.

Electronic components described in manufacturer's catalog

Terminals, terminal boards, diode holders, battery holders, banana plugs and jacks, and test leads are described in 32-page electronic components catalog. Construction material and finish are noted for each item.

Cat 56 is issued by Keystone Electronics Corp., Dept. CP, 423 Broome St., New York 13, N.Y. When inquiring specify 4327 on form opposite last page.

Shows adjustable transformers for alternating-current use

Continuously-adjustable voltage control devices for AC use are shown and discussed in 24-page bulletin. Dimensional drawings, in addition to photographs, are included for all models. Bulletin also lists specifications and tabulates prices of equipment.

Bul "O" is issued by General Radio Co., Dept. CP, 275 Massachusetts Ave., Cambridge 39, Mass. When inquiring specify 4328 on form opposite last page.

Suggests paint formulations for use with polyvinyl acetate emulsions

Three suggested paint formulations, primer-sealer, interior flat white, and exterior white, for use with company's Vinac WR-SO polyvinyl acetate emulsion, are presented in seven-page bulletin. List of raw material sources is included.

Bul PVB-521A is issued by Colton Chemical Co., Div. of Air Reduction Co., Inc., Dept. CP, 1747 Chester Ave., Cleveland 14, Ohio. When inquiring specify 4329 on form which is located opposite last page.

Alkyd resin kettle fabricated by Process Engineering & Machine Co., Inc., Elizabeth, N. J.

Lukens clad steel cuts kettle cost

Purity—with economy—assured in alkyd resin vessel

Utmost purity of alkyd resins to give highest gloss and reflectivity to paints. That's just one advantage gained by fabricating this Dowtherm-heated alkyd resin kettle from Lukens 316 stainless-clad steel. Of equal importance is the first-cost economy this material offers.

John Lucas & Co. of Gibbsboro, N. J. achieved faster heat transfer with stainless-clad, and hence greater process efficiency, because of this material's carbon steel backing. The clad steel cost them less than solid high alloy. And, despite the kettle's many fittings and two jackets, fabrication presented no great difficulty.

Lukens clad steels, from 3/16" gage up, have achieved new economies and efficiency throughout the chemical industry. Only Lukens makes available a choice of 16 cladding and 11 backing metals to meet virtually any tank or pressure vessel need. *Consult your equipment builders or write for new technical booklet, "Clad Steel Equipment." Address Manager, Marketing Service, Room 950, Lukens Steel Company, Coatesville, Pennsylvania.*

This is Lukens clad steel—not a lining, not a soldered-on surface, but a solid steel plate—one side corrosion resistant metal permanently bonded over-all to rugged, economical backing steel.

LUKENS

Helping industry choose steels that fit the job

When inquiring check 4330 opposite last page

Resistance to Heat Transfer Through Tube Walls

NELSON S. EMBREY
The Babcock & Wilcox Co., Lynchburg, Va.

In calculations dealing with optimum design of heat exchangers and with performance of a number of units, resistance R (reciprocal of conductance of the tube wall h) is defined by

$$R = \frac{1}{h} = \frac{t_e}{K}$$

where t_e, equivalent thickness of the tube wall, is given by

$$t_e = \frac{OD}{2} \ln \frac{OD}{ID}$$

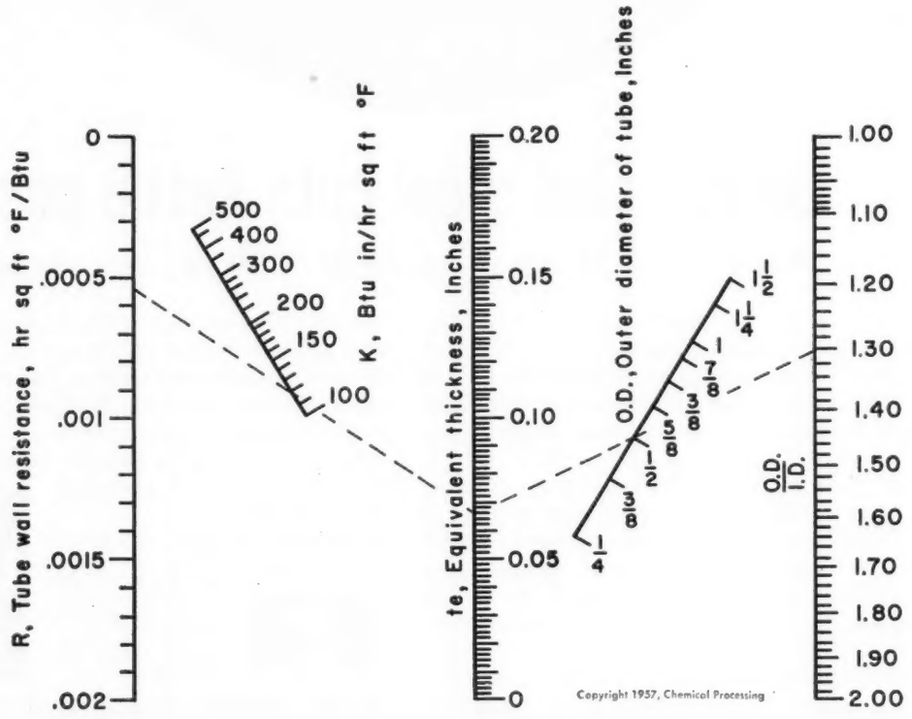
Accompanying nomograph enables one to solve the combined equation:

$$R = \frac{OD}{2K} \ln \frac{OD}{ID}$$

where, R is resistance of tube walls, (hr) (sq ft) (°F)/Btu, ID and OD are inner and outer diameters of the tube, (inches), and k is the thermal conductivity of the metal, (Btu) (in)/(hr) (sq ft) (°F).

To use the chart, connect the ratio of outer to inner diameter with the outer diameter and read the equivalent thickness of tube wall on the t_e scale. Connect this point with the thermal conductivity and read the resistance of the tube wall on the R scale.

The chart was constructed by means of methods described by D. S. Davis and R. P. Genereaux in the section entitled "Alignment Charts" in the third edition of the "Chemical Engineers' Handbook," McGraw-Hill Book Co., Inc., 1950.



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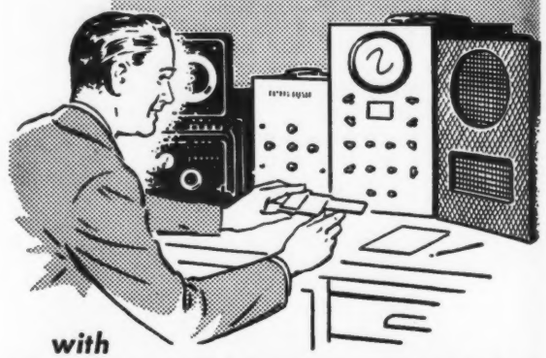
STOP
EXHAUST NOISE and PIPING VIBRATION



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BURGESS-MANNING SNUBBERS

Burgess-Manning engineers have spent years of scientific research into the cause and nature of exhaust noise and pipe line vibration. Out of this research came the Burgess-Manning Snubbing Principle.

Throughout the world, Burgess-Manning Snubbers, utilizing this unique principle, are eliminating the deafening, efficiency-reducing roar of engine exhaust and the destructive effects of pipe system vibration and pulsation where compressible gases are pumped.

Engineered by specialists for the specific applications, Burgess-Manning Snubbers pay for themselves in increased efficiency of equipment and personnel, lowered maintenance costs, improved labor and neighborhood relations.

This engineering service, with years of experience in the elimination of noise and vibration, is available for consultation on your problem without obligation.

Write for copies of case histories of typical installations.

Present your problems for Analysis and Recommendations

BURGESS-MANNING COMPANY
Sound Engineering
721 East Park Avenue, Libertyville, Illinois
Dallas, Texas

When inquiring check 4331 opposite last page

Rapid, visual temperature checks with thermal imaging device

Instrument that can be used for locating and monitoring either hot or cold spots is described in 12-page bulletin. Bulletin deals with principles of operation, radiation measurement theory, temperature measurement methods, and related information. Schematics, curves, engineering drawings, and specifications are included.

Bul RD-515 is issued by Baird Associates-Atomic Instrument Co., Dept. CP, 33 University Rd., Cambridge 38, Mass. When inquiring specify 4332 on form opposite last page.

Data on corrosion- and heat-resisting stainless steel castings

Booklet of 28 pages describes services, facilities, and experience of company in manufacture of stainless steel castings. Special 7-page section presents technical data including physical properties, chemical compositions, resistance to corrosion and oxidation, strength at room and elevated temperature, creep strength, and heat treatments. Applications and composite list of uses of corrosion- and heat-resisting castings are included.

"Stainless Castings" is issued by Allegheny Ludlum Steel Corp., Dept. CP, 2020 Oliver Bldg., Pittsburgh 22, Pa. Specify 4333 opp. last page.

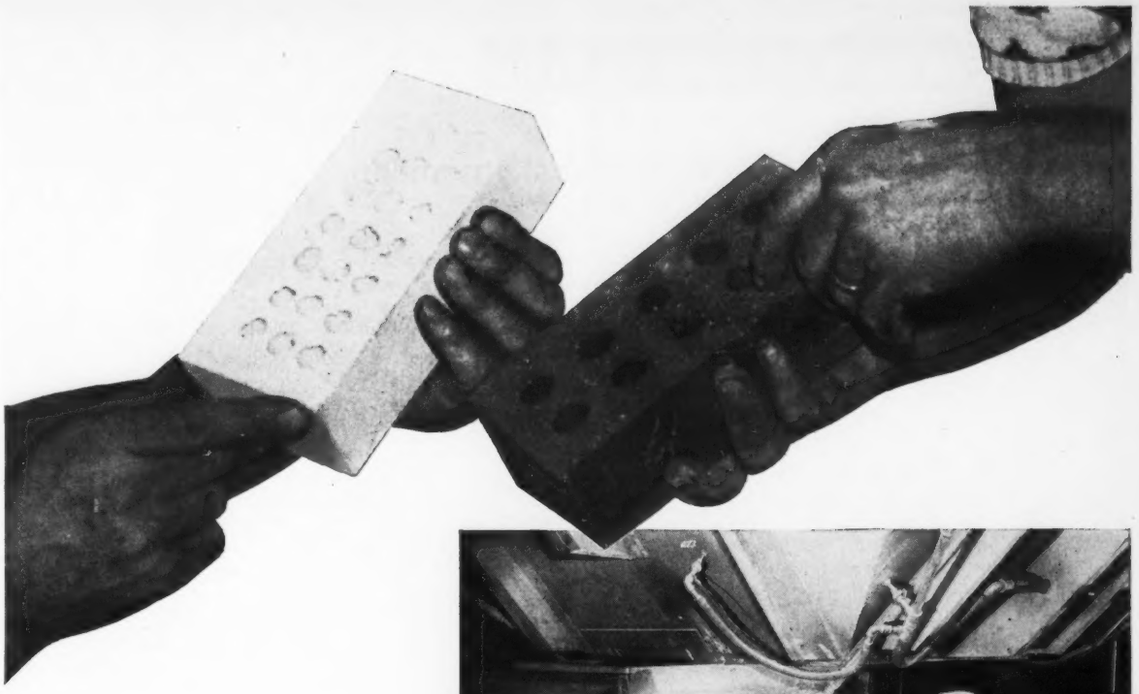
Tells how automatic lubrication cuts packing costs

Six-page reprint gives reasons for current trend toward use of automatic lubrication equipment in various packaging operations. Seven different installations are discussed, with operating problems and maintenance solutions described. Photographs illustrate six of the installations.

Bul E-6 can be obtained by writing to "Service", Bijur Lubricating Corp., Dept. CP, 151 W. Passaic St., Rochelle Park, N. J. When inquiring specify 4334 on form opposite last page.

Tells all about dipentene monoxide and alpha-pinene oxide

Pair of bulletins tells properties, reactions, suggested uses of two terpene oxides. Bul 81 covers dipentene monoxide and Bul 82 describes alpha-pinene oxide. Both are issued by Becco Chemical Div., Food Machinery & Chemical Corp., Dept. CP, Sta. B, Buffalo 7, N.Y. Check 4335 on form opposite last page.



Exact proportioning creates colors customers want

The Stone Creek Brick Company, Stone Creek, Ohio, gets the exact color in every batch by proportioning brick ingredients with Jeffrey WAYTROLS.

JEFFREY WAYTROLS® automatically proportion brick ingredients

Giving the customer the color he wants helps sell bricks as well as automobiles. This need for accurate proportioning of materials explains why so many of these electric vibrating feeders are employed in so many industries.

In hundreds of processing plants, Jeffrey WAYTROLS are automatically weighing and delivering exact quantities for mixes going into every kind of product. The WAYTROL is a precision machine, designed for continuous service . . . sturdy, accurate and flexible. Rate of delivery is regulated through a weighbelt mechanism, but control is electrical, with instant response.

Catalog 841 describes the WAYTROL. The Jeffrey Manufacturing Company, 853 North Fourth St., Columbus 16, Ohio.

CONVEYING • PROCESSING • MINING EQUIPMENT . . . TRANSMISSION MACHINERY . . . CONTRACT MANUFACTURING

JEFFREY

When inquiring check 4336 opposite last page

Pulp Chest Inventory

by

GEORGE W. LEWIS, JR.

Assistant Quality Control Supervisor

National Gypsum Co., Mobile, Ala.

Number of air-dry tons (10% moisture) of paper pulp in a square-type chest can be found by means of the equation

$$T = \frac{62.5\ hWLC}{100 \times 2000 \times 0.9}$$

which simplifies to:

$$T = 3.472\ hWLC \times 10^{-4}$$

where,

T	= weight of pulp in chest,	air-dry tons
h	= depth of pulp in chest,	feet
W	= width of chest,	feet
L	= length of chest,	feet
C	= percentage oven-dry consistency of pulp,	
62.5	= lb/cu ft of pulp of any consistency	

Typical Example

Equation is solved quickly and accurately by use of nomograph, constructed by well-known methods[1].

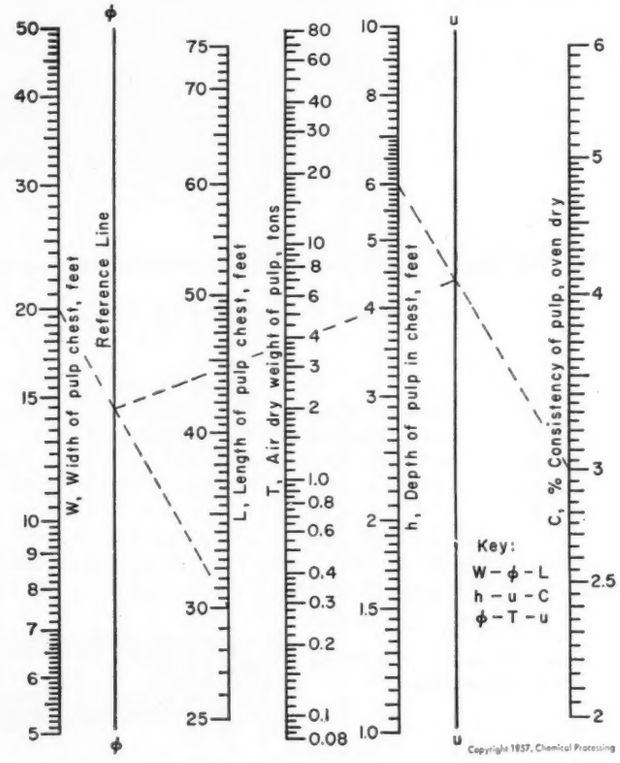
For chest width of 20′, length, 30′, pulp depth, 6′, and 3%, consistency of pulp, connect (see key) points on W-scale (20′) and L-scale (30′) (intersection is on Φ scale). Points on h- (6′) and C-scales (3%) intersect on u-scale. Connection of intersection-points on Φ-scale and u-scale intersects proper point on T-scale to give air-dry weight of pulp in chest.

For cylinder chests, see nomograph by Lewis[2].

LITERATURE CITED

1) Davis, D. S., "Empirical Equations and Nomography," Chap. 5, McGraw-Hill Book Co., Inc., New York, (1943).

2) Lewis G. W., "Pulp Inventory Nomograph for Bleach Plants", *CHEMICAL PROCESSING*, 19 (5) 220 (1956).


W, Width of pulp chest, feet
Reference Line
L, Length of pulp chest, feet
T, Air dry weight of pulp, tons
h, Depth of pulp in chest, feet
C, % Consistency of pulp, oven dry
Key:
W – ϕ – L
h – u – C
ϕ – T – u
Copyright 1957, Chemical Processing

CUT HERE AND FILE

GARDEN CITY FANS
at JACKSON TILE
"have proven satisfactory"

JACKSON TILE Jackson, Mississippi, has one of the most modern plants in the world with a vast productive capacity

Garden City high-temperature fans, with a range of 400 to 1300 degrees Fahrenheit, are installed on the glaze and tunnel kilns of the famous Jackson Tile plant. Chosen because the patented air-cooled shaft prolongs the life of the bearings, helps keep production rolling without interruption. "Some of these fans have been operating for several years and have proven quite satisfactory", the plant engineer says. Why not find out how they can help you cut maintenance costs?

TEAR OUT THIS AD . . . a reminder to write for FREE CATALOG AND LIST OF "BLUE CHIP" USERS

GARDEN CITY FAN COMPANY
ESTABLISHED 1879

332 S. Michigan Ave.
Chicago 4, Illinois
Dept. P

Representatives in Principal Cities

• Fans for Industry • Backward Curve • Forward Curve
• Material Handling • Radial Bladed • Small Exhaust

When inquiring check 4337 opposite last page

Bulletins describe family of protective coatings

Loose-leaf bound group of eight manufacturer's bulletins describe family of corrosion-resistant coatings utilizing vinyl base material. Functional properties, application instructions, recommended treatments, table of chemical resistance, general limitations, and cost factors in maintenance painting program are data covered by bulletins. Price list is also included.

"Tygon Protective Coatings" is issued by The United States Stoneware Co., Dept. CP, PO Box 350, Akron, Ohio. When inquiring specify 4338 on form opposite last page.

Explains how and why of analyzer using thermal conductivity method

Principle, construction, operation and features of thermal conductivity gas analyzer and recorder are explained in 12-page bulletin. Instrument can be used for analyzing CO_2, H_2, He, CH_4, and other gases. Bulletin also contains special section on gas sampling systems.

Bul 56-1008-59 is issued by The Hays Corp., Dept. CP, Michigan City, Ind. . . . or for more information reader may simply specify 4339 on form opposite last page.

Folder presents thorough resume of manufacturer's antioxidants

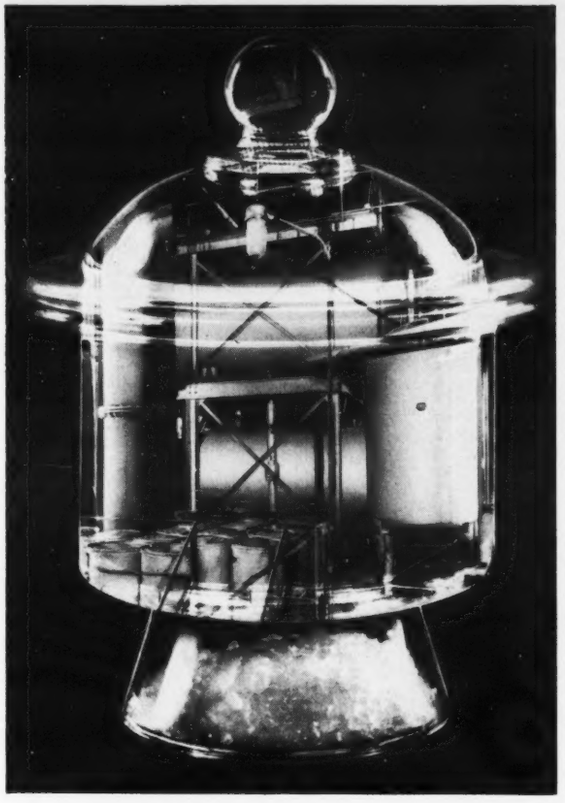
Structural formulas, properties, composition, and popular applications of various antioxidants are charted in four-page folder. Folder includes list of manufacturer's representatives throughout country.

"Tenox" is issued by Eastman Chemical Products, Inc., Dept. CP, Kingsport, Tenn. When inquiring reader may simply specify 4340 on form opposite last page.

Describes line of phenolic molding materials, resins

Detailed technical data, special properties and product features of phenolic molding powders, rubber phenolic molding powders, phenolic laminating varnishes, and industrial and foundry resins are covered in 12-page catalog.

Cat CDC-322 is issued by Chemical Materials Dept., General Electric Co., Dept. CP, One Plastics Ave., Pittsfield, Mass. . . . or for more information specify 4341 opposite last page.



Extract all water from the system?

Put Inco Nickel in critical zones?

Which is the easier way to cut your losses from corrosion of chlorinated solvent equipment?

Keep your processing or recovery system free of moisture . . . operate it at atmospheric temperature . . . and you are not likely to have trouble from corrosion when handling chlorinated solvents.

But how often is it practical to keep trace water out . . . or take it out once in? And how do you prevent major variations in temperature that cause condensation?

Its easier by far to put Inco Nickel in critical zones

Easier . . . and in the long run . . . least expensive. Experience in a large number of installations shows two reasons for this.

First, the dilute HCl formed by decomposition of the solvent-water mixture or vapor attacks nickel much less readily than steel.

Second, there is less hydrolysis of the solvent in nickel equipment than in steel and less formation of the HCl that causes the corrosion.

These two effects combine to keep the corrosion rate of nickel in most chlorinated solvents to negligible proportions . . . a fact that has enabled many to greatly increase equipment life.

A large eastern producer, for example, uses Inco Nickel for CCl_4 purifying stills, for reboilers of primary separation stills, for chlorinator coolers, for neutralizers (where distillate is washed with caustic), for condenser coils. At present, they are putting in a nickel shell-and-tube heat exchanger for cooling CCl_4 liquor.

The experience of other companies and the results of laboratory work on this subject are included in Inco's Technical Bulletin T-29. May we send you a copy?

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

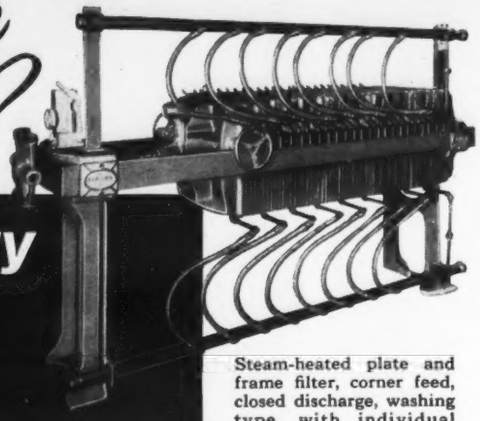
INCO TRADE MARK

Inco Nickel... *for low maintenance*

When inquiring check 4342 opposite last page

Can't be Done?

Let's try it in a Filter Press



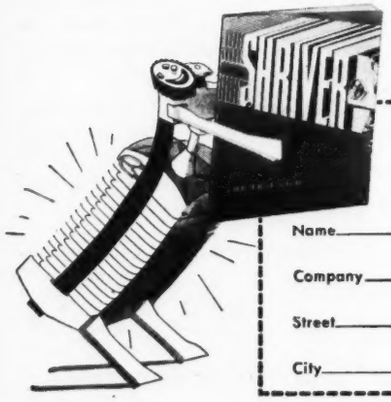
Steam-heated plate and frame filter, corner feed, closed discharge, washing type, with individual sampling cocks for each chamber.

Tried it in your laboratory filter and it didn't work out? Couldn't get satisfactory flow rate or proper cake build-up? Process too slow? The material too viscous or gelatinous or what-have-you?

We've heard all these before. Yet we have proved a thousand times that what the user first considered a tough filtration assignment turned out a routine problem, readily solved in our laboratory. Of course, many problems were challenging, but Shriver experience and designs overcame them, too.

Shriver's long record in solving problems of filtration, washing, extraction or thickening, with the kind of filter press best suited to specific operating conditions, is your assurance of dependable service from laboratory to plant size equipment.

It will pay you to get the Shriver story. Use the coupon.



SHRIVER
for better filtration

T. SHRIVER & COMPANY, Inc.
846 Hamilton St., Harrison, N. J.

Send me this filtration fact and data book.

Name_____ Title_____

Company_____

Street_____

City_____ State_____

When inquiring check 4343 opposite last page

NEW LITERATURE

Lists equipment for measurement and control of liquids, gases

Manufacturer's equipment for measuring and control of liquids and gases is listed in 36-page revised bulletin. Equipment, such as controllers, gages, manometers, meters, recorders, and valves, is illustrated and described. Capacities and specifications are presented.

Bul 005 is issued by Simplex Valve & Meter Co., Dept. CP, 7 E. Orange St., Lancaster, Pa. When inquiring specify 4344 on form opposite last page.

Describes ceramic applications of polyvinyl alcohol

Technical bulletin of four pages describes properties of polyvinyl alcohol and its application to whitewares, refractories and electronic ceramics, and glazes. Bulletin gives directions for preparing solutions for forming operations —for typical extrusion and dry pressing mixtures.

Tech Bul PVB-44A is issued by Colton Chemical Co., Div. of Air Reduction Co., Inc., Dept. CP, 1747 Chester Ave., Cleveland 14, Ohio. When inquiring specify 4345 on form opposite last page.

WANTED:

BUDDING CARTOONISTS!

CHEMICAL PROCESSING is in the market for cartoons (and cartoon ideas). They should touch on some aspect of chemical plant or lab work.

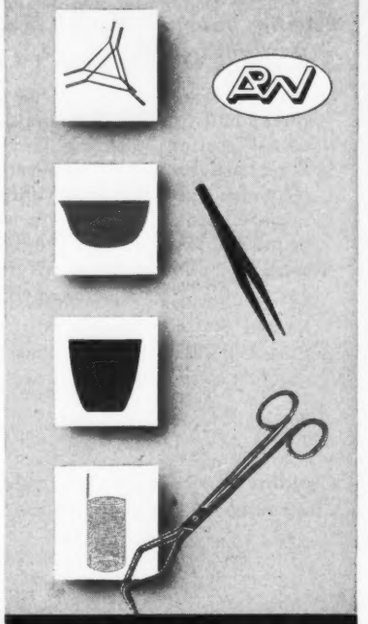
Worth $10—Cartoons in black ink on 8½ x 11" sheets—ready to reproduce—will be bought for *$10*, paid on acceptance.

Worth $5—Cartoon *ideas* . . . a written description or rough sketch of scene, and a caption . . . worth *$5*, on acceptance.

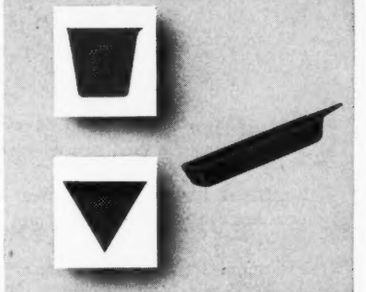
Send your gag material to:

Cartoon Editor, CHEMICAL PROCESSING
111 East Delaware Place
Chicago 11, Illinois

Be sure to include your name, position, company, and address.



PLATINUM
LABORATORY WARE FOR SCIENCE AND INDUSTRY



Whenever there is a requirement for platinum laboratory ware and apparatus, look to APW for both quality and prompt service. We manufacture an exceptionally wide range of platinum equipment for industrial, analytical and micro analytical use, as well as special process equipment made to your specifications.

PRECIOUS METAL RECOVERY SERVICE
Here, modern APW facilities for the recovery of platinum and other precious metals from scrap and spent catalyst, assure prompt recovery and highest prices.

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THE AMERICAN PLATINUM WORKS
231 NEW JERSEY RR AVE. • NEWARK 5, N. J.
PRECIOUS METALS SINCE 1875
ENGELHARD INDUSTRIES

When inquiring check 4346 opposite last page

Deals with legal problems of atomic age

Proceedings of 1956 meeting dealing with legal problems of atomic age are recorded in 220-page publication. Specific aspects considered are: state regulation of atomic energy, liability for radiation injuries — workmen's compensation, licensing and commission control, international legal problems, and patent problems. Publication contains all papers, reports, and comments, as well as additional supplemental materials.

To obtain "Workshops on Legal Problems of Atomic Energy" remit $2.00 direct to Mrs. Sally Miller, Dept. CP, 743 Legal Research Bldg., University of Michigan, Ann Arbor, Mich.

Details complete line of jar mills and jar rolling mills

Manuafcturer's line of jar mills and jar rolling mills for laboratory, pilot plant, and small production is detailed in 24-page catalog. Operation is described, and section is devoted to information on how to select right size mill.

Sec A, Cat Y is issued by Paul O. Abbe, Inc., Dept. CP, 152 Center Ave., Little Falls, N.J. When inquiring specify 4347 on form which is located opposite last page.

Offers ball point pens as safety incentives

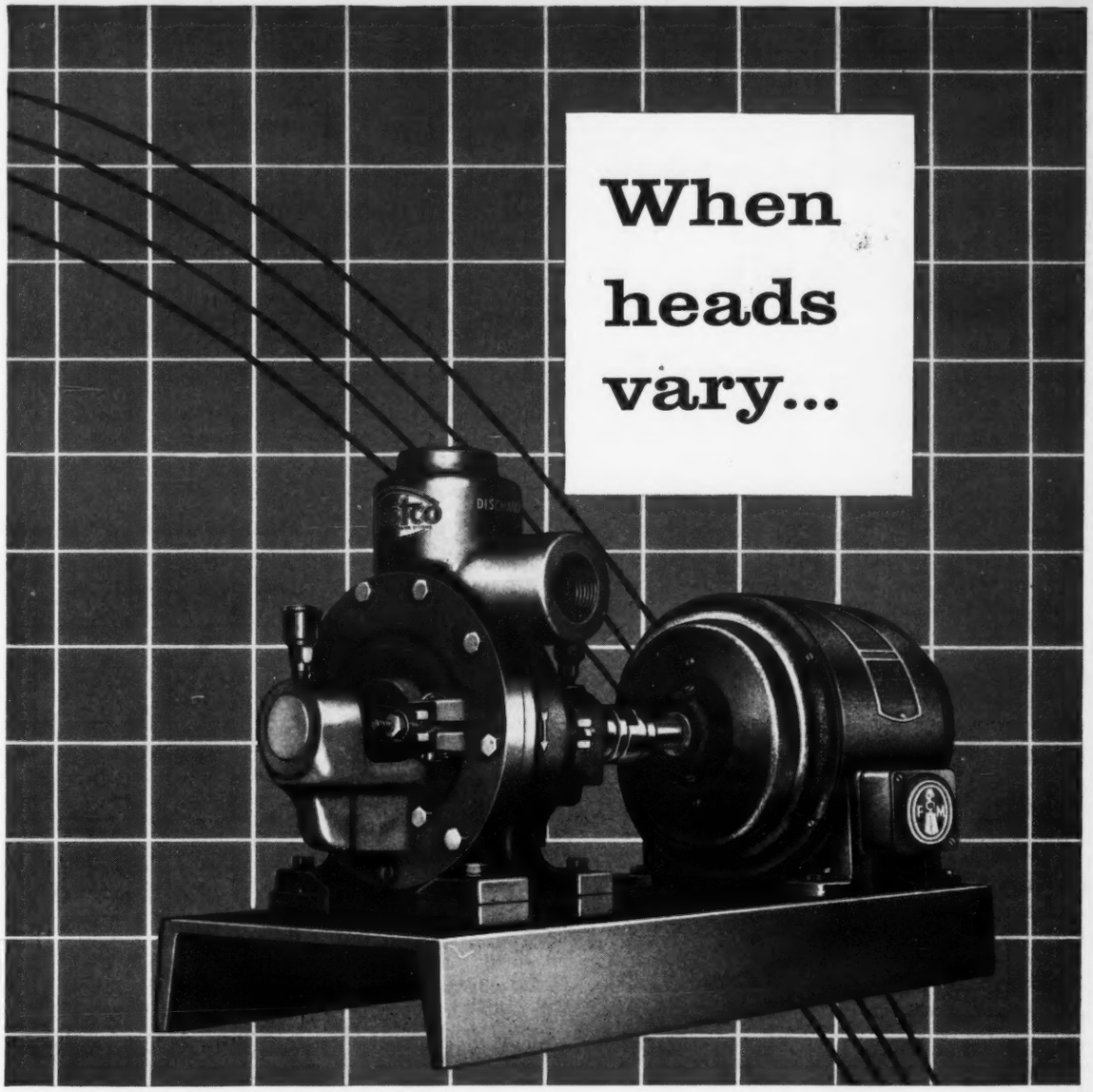
Two-page bulletin describes and tells how to order ball point pens for use as incentive awards in company safety programs. Pens come in two models and eight colors. Included are instructions for ordering pens imprinted with company names or trademarks.

"Green Cross" ball point pen literature is issued by National Safety Council, Dept. CP, 425 N. Michigan Ave., Chicago 11, Ill. When inquiring specify 4348 on form opposite last page.

Chromizing process described in 8-page bulletin

Process that diffuses chromium into iron and steel parts to provide greater corrosion resistance is described in eight-page bulletin. Results of corrosion tests run on various chromallized steels are reported. Several case histories document successful applications of process.

Bul 3-1 is issued by Chromalloy Corp., Dept. CP, 450 Tarrytown Rd., White Plains, N.Y. Specify 4349 on form opposite last page.



Install a Fairbanks-Morse Westco peripheral pump . . . and make sure of efficiency with little or no loss of capacity!

How? Through original F-M Westco design—these pumps deliver approximately the same capacity when discharging against high pressure or low pressure—and all at 1750 rpm.! Another important point: by featuring a multi-vaned impeller, these Westco peripheral pumps deliver multi-stage performance from a single-stage pump.

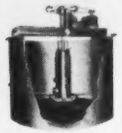
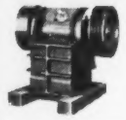
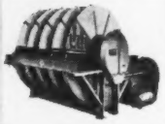
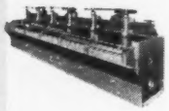
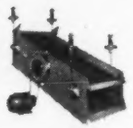
You'll find Westco peripheral pumps ideal as integral parts of machines, units or systems . . . such as circulating hot water, ice water or brine . . . or for service on clear water, sump, solvents or chemical fluids, feeding filters or boilers, or as booster pumps. Capacities to 200 gpm., heads to 600 feet. For complete information and assistance contact your F-M Pump Dealer, or write today to Fairbanks, Morse & Co., Dept. CP-6, 600 South Michigan Avenue, Chicago 5, Illinois.

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

When inquiring check 4350 opposite last page

DENVER PROCESS EQUIPMENT

DENVER (patented) **SUPER AGITATORS and MIXERS**		**SIZES** 3'x 3' to 20'x 20'	Patented standpipe around propeller shaft assures positive agitation and circulation. Patented wearing plate prevents sand-up on shut-down. Heavy duty as well as acid-proof construction is available in both open-type, air lift and Super Agitator models. Please write for Bulletin No. A2-B4.
DENVER Steel-Head **BALL MILL**		3'x 2' to 6'x 20'	A Denver Steel-Head Ball Mill will suit your particular need. Five types of discharge trunnions. All-steel construction. Low initial cost due to quantity production. Quick delivery. Laboratory and pilot plant mills also available. Please write for Bulletin No. B2-B13.
DENVER Forced-Feed **JAW CRUSHER**		2¼"x 3½" to 36"x 48"	Cast Steel Frame, manganese jaw and cheek plates. Large diameter shafts reduce shaft deflection and thus increase life of heavy-duty, oversize roller bearings in bumper. Setting easily controlled. Please write for Bulletin No. C12-B12.
DENVER Disc **FILTER**		to 12 Disc, 9' Tank Agitator can be supplied	Special, patented design of segments in Denver Disc Filters use both gravity and vacuum to give a drier filter cake. Drainage is complete and positive, with no blow-back. Simple, low-cost, dependable construction. Quick delivery. Also Drum and Pan Fillers. Please write for Bulletin No. FG-B1.
DENVER "Sub-A" **FLOTATION**		Laboratory and Commercial	Flotation is the selective separation of particles from each other in a liquid pulp by means of air bubbles. More large plants are installing Denver "Sub-A's" for their entire flotation job, because they give maximum recovery at a low cost per ton. Dependable, low-cost, simplified continuous operation. Please write for Bulletin No. F10-B81.
DENVER Rubber Lined **PUMPS**		Up to 2400 G.P.M.	Denver (Soft Rubber Lined) Sand Pumps lower pumping costs 30% to 70% due to simple design, lighter weight and accuracy of rubber parts which increase efficiency 1½ to 3 times over other sand pumps. Have molded rubber impellers and casing liners for long life. Write for Bulletin No. P9-B8.
DENVER Automatic **SAMPLERS**		16" to 60" Cutter Travel	Heavy duty units, extra rigid track and ball-bearing wheels assure positive travel and timing of sample cutter. Available in stainless steel for acid anl corrosive service. Wet and dry cutters. Central Control Panel for multiple samplers. Bulletin No. S1-B4.
DENVER-DILLON Vibrating **SCREENS**		1'x 3' to 6'x 14'	Gives fast, clean separation without blinding. Gives even, smooth flow of material because of the patented "true-circle" eccentric action. Two-bearing construction saves 50% HP. Please write for Bulletin No. S3-B11.
DENVER Spiral Rake **THICKENER**		3'x 3' to 80'x 12'	Enclosed, running-in-oil head motion. Patented spiral rakes move settled solids to center discharge with continuous motion, rapid removal of solids tends to eliminate overload. Wood, Steel or Rubber-lined Tanks available. Write for Bulletin No. T5-B5.
DENVER Batch and Continuous **TESTING**		Laboratory and Pilot	Use Denver Testing Laboratory facilities for complete batch or pilot tests—your engineers or ours. Ample test facilities for investigations on crushing, grinding, mixing, classification, separation, sampling, leaching, concentration, thickening, filtration and drying. Consultation is without obligation. Please write for Bulletin No. T4-B15.

One source . . . one responsibility

DENVER EQUIPMENT COMPANY

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New York • Chicago • Toronto • Vancouver • Mexico, D.F. • London • Johannesburg

When inquiring check 4351 opposite last page

NEW LITERATURE

Reprint discusses x-rays in atomic research

Reprint of four pages covers atomic research problems solved with x-rays. Subjects include barium impurities in zirconium, water molecules in uranyl sulphate, aluminum corrosion products, and quality control of stainless steels, aluminum and silver-platinum alloys, solders and brasses.

"X-rays Pierce Problems in Atomic Research" is available from Instruments Div., North American Philips Co., Inc., Dept. CP, 750 S. Fulton Ave., Mount Vernon, N.Y. When inquiring specify 4352 on form opp. last page.

Describes combination dehydrating and deodorizing agent

Combination agent for eliminating gaseous irritants as well as desiccating the air is described in four-page bulletin. Characteristics and recommended uses of the activated carbon material are covered.

Bul J-34 is issued by Barnebey-Cheney Co., Dept. CP, Cassady at Eighth Ave., Columbus 19, Ohio. Specify 4353 on form opposite last page.

Defines factors affecting selection of meters for industrial liquids

Revised 16-page industrial meter bulletin offers information on factors affecting meter selection. Temperature, viscosity, pressure, and registration data are presented. Oscillating piston meters, recommended for variety of chemicals and industrial liquids are described. Explanation of various metering terms is given.

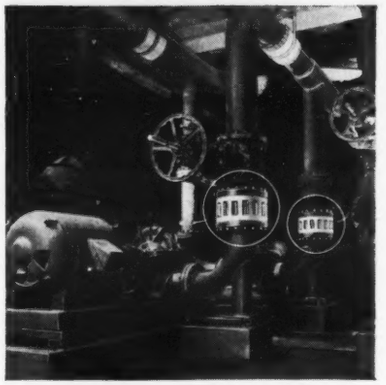
Bul OG-400 is issued by Rockwell Mfg. Co., Dept. CP, 400 N. Lexington Ave., Pittsburgh 8, Pa. Specify 4354 on form opposite last page.

Colorful catalog on control units

Manufacturer's line of oil-tight control units is presented in multi-colored booklet which highlights various indicating-light colors. Handy index, keyed to colors, makes foldout sections of booklet quickly accessible. Illustrated sections include pushbuttons, indicating lights, selector switches, roto-push buttons, covers and enclosures, and accessories. Dimensional data are listed.

"C-H Master Design" is issued by Cutler-Hammer Inc., Dept. CP, 563 N. 12th St., Milwaukee, Wis. Specify 4355 on form opp. last page.

STOP
SURGE-PRESSURE DAMAGE
in Air Conditioning Systems



Installation in 525 William Penn Place Building in Pittsburgh.

Globe type for 3" to 24" lines.

Center-guided type for 1" to 10" lines.

WILLIAMS-HAGER
FLANGED
Silent
CHECK VALVES

Surge pressures . . . and resulting water hammer . . . are effectively controlled by these valves. They close instantly whenever flow reversal starts, or when flow is zero—providing dependable protection for piping, pumps and other components in air conditioning systems.

Write for Bulletins:
No. 654 on the Valves
No. 851 on Cause, Effect and Control of Water Hammer

THE WILLIAMS GAUGE CO., INC.
146 Stanwix Street
2 Gateway Center Pittsburgh 22, Pa.
Our 71st Year • 1886-1957

When inquiring check 4356 opposite last page

Continuous coking process defined

Flexible, continuous process for upgrading wide range of low-value residual stocks to gas oil, gasoline, and by-product gas and coke is described in 16-page bulletin. Process description and highlights, process flow, feed stocks, and product yields and quality are covered. Economics of process are discussed, and installation table shows units operating or under construction.

To obtain "Fluid Coking" write direct to Esso Research and Engineering Co., 15 W. 51st St., New York 19, N.Y.

Tells about tubes and fittings for vacuum systems, conveyors

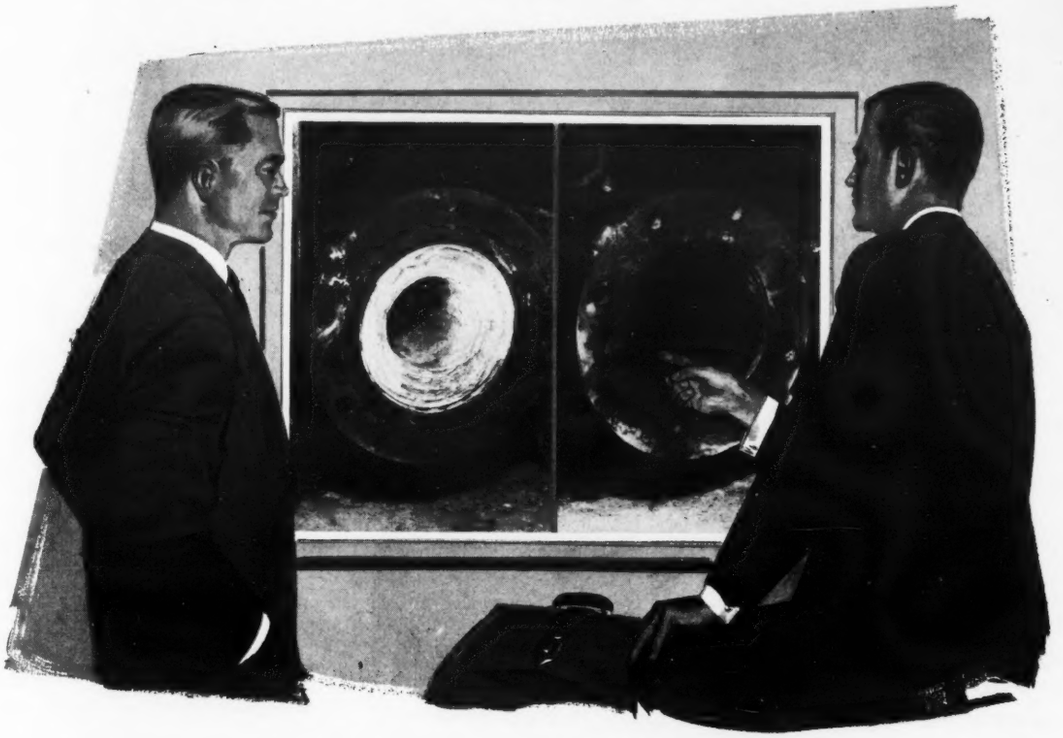
Bulletin of six pages gives specifications for tubes and fittings for vacuum systems and conveying lines carrying liquids, gases, or air-borne solids. Quick, easy assembly and dismantling methods, and cost savings are pointed out.

Bul V-157 is issued by H-P Products, Inc., Dept. CP, Louisville, Ohio. When inquiring specify 4357 on form opposite last page.

"Here we add a generous slug of bourbon —"

Thanks to James V. Redding, The Central Pharmacal Company, Seymour, Indiana

here's how Dowell chemical cleaning saved $71,000 and helped protect a plant profit!



A few months before their peak season, the operators of this plant decided their main water line might not supply the water necessary to meet peak demands. The line was cast-iron, 16-inches in diameter and over 7,000 feet long. Its original flow efficiency or "C" factor had been 105; scale build-up had reduced this to 72. To lay an auxiliary line would cost at least $85,000.

Dowell contracted to clean the pipe chemically for a little less than $14,000, and to restore a minimum of 50 per cent of the line's lost capacity.

This Dowell did, and more—increasing the "C" factor to 92! Enough water was immediately available for capacity operation. This saved the plant $71,000 and helped protect the company's annual profit.

The operating credit realized by this food processing plant, as a result of Dowell service, is similar to those realized by other Dowell customers—in the steel, paper, chemical, oil refining, power and allied industries.

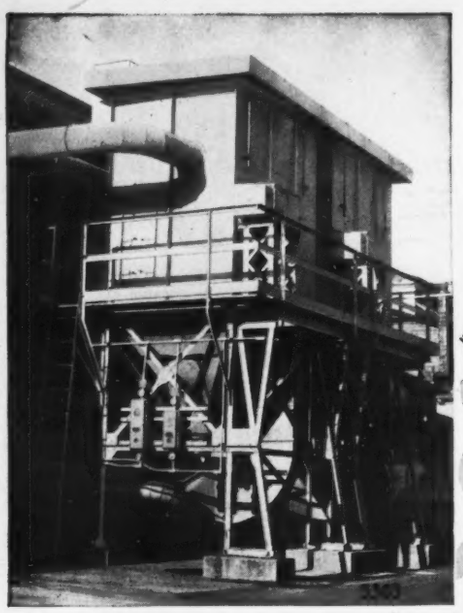
Dowell engineers are experts in the use of solvents to remove scale and sludge—deposits that cut the throughput of product, process and steam generating systems. Dowell does the job, furnishing all chemicals, trained personnel, pumping and control equipment.

For specific information on how chemical cleaning can help you to greater profits, call the Dowell office nearest you. Or write Dowell Incorporated, Tulsa 1, Oklahoma.

Have Dowell clean it chemically DOWELL

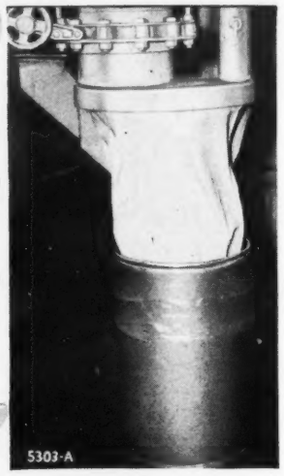
A SERVICE SUBSIDIARY OF THE DOW CHEMICAL COMPANY

When inquiring check 4358 opposite last page



Sly Dust Filter at the plant of Merck & Co., Inc., Rahway, New Jersey.

SLY KEEPS VITAMIN PLANT DUST-FREE



Packaging Unit showing exhaust duct connected to Sly Dust Filter.

Merck & Co., Inc. uses Sly Dust Filters to maintain quality of product and manufacturing efficiency in the processing of vitamin mixtures.

The final ground powders are blended, milled, sifted and subdivided. Dust tends to escape from each operation. By the use of proper hooding of dust sources the dust is drawn into Sly Dust Collector. About 1.10 to 1.25 percent of each mixture is recovered and reused.

During the past ten years Merck has installed 21 Sly Dust Filters —a fine tribute from a fine company.

No matter what you make or process—if there's dust, you need Sly.

Manufacturers of: Dust Control Systems, Blast Cleaning Equipment, Tumbling Mills, Industrial Ovens.

THE W. W. SLY MANUFACTURING CO.

SINCE 1874

4754 TRAIN AVENUE • CLEVELAND 1, OHIO

OFFICES IN PRINCIPAL CITIES

PIONEERS AND LEADERS IN INDUSTRIAL DUST CONTROL

When inquiring check 4359 opposite last page

NEW LITERATURE

Describes operation and features of filled-tube system recorders

Temperature and pressure recorders are covered in four-page bulletin. Workings and advantages of filled-tube system recorders are described, and six types of pens are listed. Illustrations, including blueprints showing makeup, installation and operation of recorders, are presented. Drawings and explanation detail movement of pen arms and assembly and design.

Cat 1021 is issued by Pen Instruments Div., Burgess-Manning Co., Dept. CP, 4110 Haverford Ave., Philadelphia 4, Pa. When inquiring specify 4360 on form opposite last page.

Describes nuclear reactors for research

Characteristics and uses of three nuclear research reactors are described in 12-page bulletin. Swimming pool, heavy-water, and nuclear test reactors are explained and illustrated. Brief resume of company's experience in nuclear field and summary of a comparison of research reactors is included.

Bul GEA 6326-B is available from Apparatus Sales Div., General Electric Company, Dept. CP, Schenectady 5, N. Y. When inquiring specify 4361 on form opposite last page.

All-direction, high-speed vibrator features only one moving part

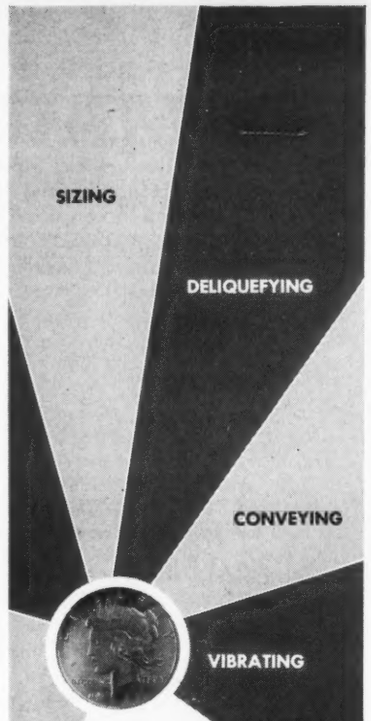
Operating principles, construction, and features of all-directional, high-speed pneumatic vibrator having only one moving part are detailed in 38-page catalog. Photographs show units, mountings, and adaptors. Applications of vibrators are also shown. Specifications for all equipment are listed.

Cat on vibrators is issued by Martin Engineering Co., Dept. CP, Neponset, Ill. When inquiring specify 4362 on form opposite last page.

Laboratory glassware catalog

Composition, chemical durability, softening point, temperature limits, and vacuum use of manufacturer's brand of laboratory glassware are summarized in catalog. Containing 140 pages, plus index, catalog lists complete line, indicating use, specifications, and price.

CA-2 is issued by Corning Glass Works, Dept. CP, Corning, N.Y. When inquiring specify 4363 on form opposite last page.



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You'll find stainless steel Bee-Zee Screens everywhere. They're separating with precise accuracy . . . deliquefying with "last drop" thoroughness. They're fitted to every type of screening equipment . . . electronically precision-welded into every conceivable shape, in every needed dimension.

And, everywhere, Bee-Zee Screens are responsible for extra dollars of profit. Find out how it can happen to you by writing, wiring or phoning Galesburg 4397 collect. Ask for the new Bixby-Zimmer catalog.

ROUND-ROD SCREEN
long-life accuracy

GRIZZLY ROD SCREEN
rugged accuracy

ISO-ROD SCREEN
prolonged accuracy

TRI-ROD SCREEN
knife-like accuracy

GRIZZLY ROD WITH SKID ROD
ruggedest accuracy

BIXBY-ZIMMER ENGINEERING COMPANY

767 Abingdon Street, Galesburg, Illinois

When inquiring check 4364 opposite last page

Gas meters, pressure regulators featured in catalog

Manufacturers revised 28-page catalog covers meters, regulators and valves. Featuring gas meters and pressure regulators, catalog also contains specifications and illustrations of gasoline, oil, and industrial meters, water meters, and plug valves for variety of applications.

Bul C-5000, Rev 8 is issued by Meter and Valve Div., Rockwell Mfg. Co., Dept. CP, 400 N. Lexington Ave., Pittsburgh 8, Pa. When inquiring specify 4365 on form opposite last page.

Over 100 color chips show hues of protective coatings

Comprehensive 32-page color manual provides practical guide for users of rust-preventive, heat-resistant, and chemical-resistant coatings. Over 100 color chips show range of hues available. Information and recommendations help user choose specific coating to protect various metal surfaces.

Form 256 is issued by Rust-Oleum Corp., Dept. CP, 2799 Oakton St., Evanston, Ill. When inquiring specify 4366 on form opposite last page.

Physical, electrical characteristics of leading silicone fluids

As an aid to designers in evaluating various silicone fluids, manufacturer offers reference bulletin describing physical and electrical characteristics of leading silicone fluids now commercially available. Data are arranged in tabular form. Brief descriptions of each fluid and application information are also provided.

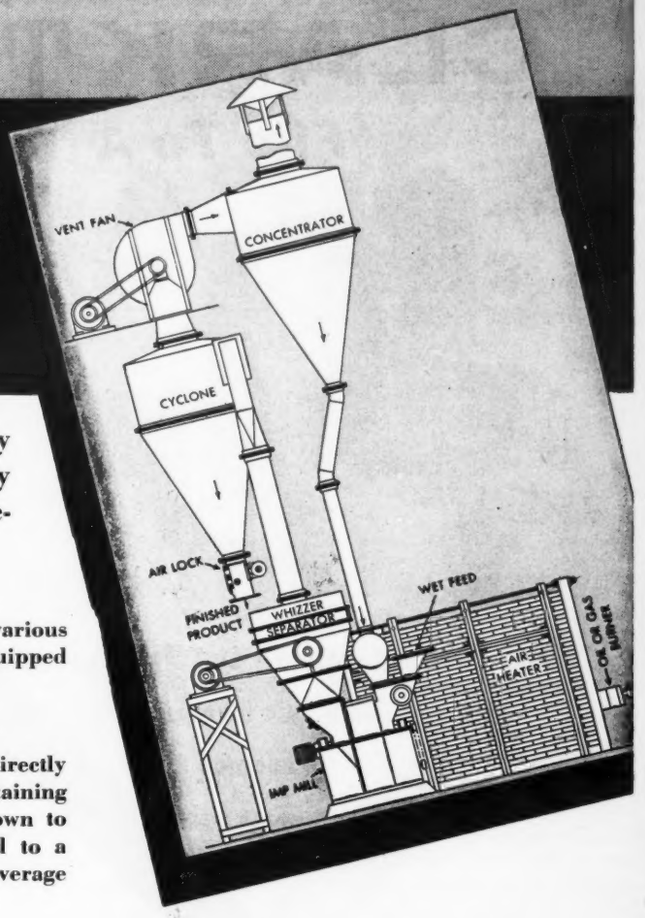
Ref bul 3-106 is issued by Dow Corning Corp., Dept. CP, Midland, Mich. When inquiring specify 4367 on form opposite last page.

Booklet outlines engineering service for users of petroleum products

Petroleum engineering service offered to industrial and commercial users of petroleum products is outlined in 24-page booklet. What service is, what it does, how much it costs, who needs it . . . and why, are questions answered in attractively illustrated booklet.

"Petro-Engineering Service" is issued by Gulf Oil Corp., Dept. CP, Gulf Bldg., Pittsburgh 19, Pa. When inquiring specify 4368 on form opposite last page.

Clay Preparation Process with the RAYMOND *Flash Drying System*



ONE OPERATION... from raw clay to finished material . . . uniformly dried and ground in a complete integrated unit of equipment!

This is a simplified method of handling various types of clay with the Raymond Imp Mill equipped with Flash Drying Accessories.

•

A typical ball and sagger clay may be fed directly to the mill in lumps about ½" size, containing approximately 25% moisture. It is dried down to less than 2% and simultaneously pulverized to a fineness of 99% minus 200 mesh at an average capacity of 5000 lb. per hour.

•

A furnace unit supplies hot gases to the system in sufficient volume to evaporate about 1550 pounds of water per hour. The operation is automatic and dustless, as the product is handled in an enclosed system to the storage bin, and the extreme fines recovered in dust collectors.

•

This modern method is economical for china clay, kaolin, ball and sagger clays, acid-treated clays for oil filtering, and filler clays used in the linoleum, paper and rubber industries.

***Typical Applications of* RAYMOND FLASH DRYING**

Clays	Diatomaceous Earth
Limestone	Filter Cake
Synthetic Resins	Recovery of
Gypsum	By-Products from
Chemicals	Industrial Wastes

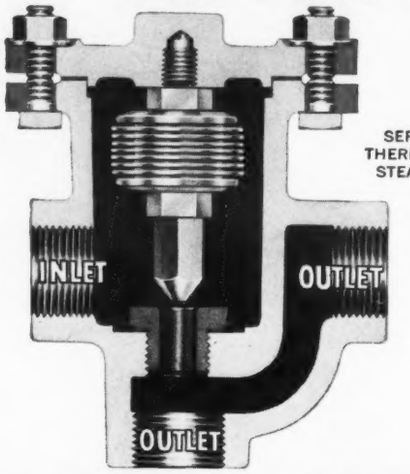
Write for further details

COMBUSTION ENGINEERING, INC.
Raymond Division
1317 North Branch St.
Chicago 22, Illinois
Sales Offices in Principal Cities
COMBUSTION ENGINEERING-SUPERHEATER LTD., Montreal, Canada

When inquiring check 4369 opposite last page

CLARK "T"

Fits To A



Easy Installation • Low Maintenance

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Economy

Ask Your Distributor For These CLARK Fluid Controls

Inverted Bucket Traps	Venting Traps	Pressure Regulators
Open Bucket Traps	Thermostatic Traps	Y-Type Strainers
Float Traps	Vacuum Traps	Pressure Reducing Valves

STANDARDIZE ON THE COMPLETE CLARK LINE

ASK YOUR DISTRIBUTOR OR WRITE DIRECT FOR FREE BROCHURES ON CLARK FLUID CONTROLS

THE Clark MANUFACTURING COMPANY

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When inquiring check 4370 opposite last page

NEW LITERATURE

Pharmaceutical flavor guide lists almost 40 groupings

Comprehensive list of recommended flavors which have proven suitable to various types of pharmaceutical products is contained in 52-page flavor guide. Covering approximately 40 pharmaceutical groupings, list presents selected flavoring recommendations, all of which have been tested and proven adaptable.

Pharmaceutical flavor guide is issued by Fritzsche Brothers, Inc., Dept. CP, 76 Ninth Ave., New York 11, N.Y. When inquiring specify 4371 on form opposite last page.

Motor control catalog has handy index

Catalog of 132 pages lists motor control apparatus such as relays, starters, switches, rheostats, regulators and accesories. Handy index along outside margin of each page gives individual bulletin number and page reference for each piece of equipment.

"Handy Cat — Seventh Edition" is issued by Allen-Bradley Co., Dept. CP, 136 W. Greenfield Ave., Milwaukee 4, Wis. When inquiring specify 4372 on form opposite last page.

Describes centrifuge for applications at pressures up to 110 psi

Bulletin of six pages describes centrifuge designed for use where continuous centrifugation at pressures as high as 100 psi is required. Features, design principles, operation, sizes, and capacities are covered. Cutaway drawing and photographs show unit and components.

Bul 2600 is issued by Dorr-Oliver Incorporated, Dept. CP, Barry Place, Stamford, Conn. When inquiring specify 4373 on form opp. last page.

Lists equipment and services for nuclear research

Catalog of 44 pages, with loose-leaf binder cover, lists various equipment and services for nuclear research. Laboratory counting systems, scalers, detectors, lead shields, personnel monitors, and survey meters are listed. Prices are quoted for all equipment, and detailed information is given on services performed by company.

"Instrumentation for Nuclear Research" is issued by Technical Associates, Dept. CP, 140 W. Providencia Ave., Burbank, Calif. When inquiring specify 4374 on form opposite last page.

USE EJECTORS!

If you have steam available and need a source of inexpensive process vacuum, use Worthington steam-jet ejectors. The advantages of Worthington ejectors are:

- *Low* initial cost
- *Low* installation cost
- *Low* maintenance cost
- No moving parts
- Installation flexibility
- No sealing liquid required
- Easy operation
- Available in any machinable material
- Handles both wet or dry gases
- Handles large volumes
- Complete line. For information about single- and multi-stage ejectors get in touch with your nearest Worthington District Office. Or write to Section S-71, Worthington Corporation, Harrison, N. J.

WORTHINGTON

When inquiring check 4375 opposite last page

Fire-resistant fluid reduces hazards of air compressor explosions

Fire- and explosion-resistant fluid, developed as lubricant for air compressors, is discussed in eight-page bulletin. Fluid is reported to minimize formation of carbon deposits on exhaust valves and air system components, thus cutting down on compressor maintenance. Physical properties and instructions for conversion of compressors to use of fluid are included.

Tech Bul 0-133 is issued by Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 800 N. Twelfth Blvd., St. Louis 1, Mo. When inquiring specify 4376 on form opposite last page.

Review of high frequency methods of chemical analysis featured

Catalog of laboratory apparatus features review of high frequency methods of chemical analysis with bibliography. Forty-four page volume also treats high frequency titration apparatus, and electrode system for potentiometric titrations with EDTA.

Vol 9, No 1 is issued by E. H. Sargent and Company, Dept. CP, 4647 W. Foster Ave., Chicago 30, Ill. Specify 4377 opp. last page.

Shows condensing systems for heat transfer

Advantages of direct-contact and indirect-surface condensers for heat transfer from batch digesters and continuous digester systems are described in four-page bulletin. Typical batch and continuous digester systems are discussed and shown in flow diagrams. Cutaway drawings of both types of condensers are included.

Bul SW-301 is issued by Swenson Evaporator Co., Div. of Whiting Corp., Dept. CP, Harvey, Ill. Specify 4378 on form opposite last page.

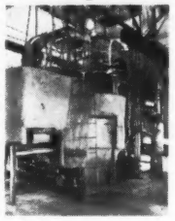
Describes processing of latex product from rubber trees to consumer

Complete description of centrifuged natural hevea latex product, from growth to marketing, is detailed in 20-page booklet. Applications, types, specifications, and information on manufacturer's services are presented.

"Unitex" is issued by Latex & Rubber Dept., Stein, Hall & Co., Inc., Dept. CP, 285 Madison Ave., New York 17, N.Y. When inquiring specify 4379 on form opposite last page.

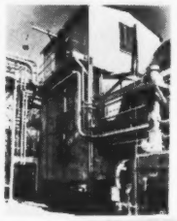
Spray Drying is the modern labor-saving process used to produce products with greater sales appeal, often at reduced production costs. Numerous processes in use today are subject to the same modernization as has been applied, with Bowen cooperation, in many leading industries:

Electronic industry benefits by a high quality finely blended homogenous Titania material which is easily extruded for special dielectric parts . . .



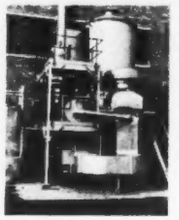
FIRST SPRAY DRIED BY **American Lava**

Evaporation loss of crude oil can now be reduced by 80-90 per cent with nitrogen-filled microscopic phenolic spheres which form vapor seal on stored crude oil . . .



FIRST SPRAY DRIED BY **Bakelite**

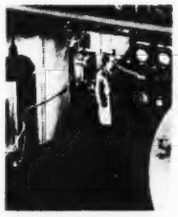
New sterile Plasma Volume Expander for intravenous injections has saved countless lives in both military and civilian use . . .



FIRST SPRAY DRIED BY **Commercial Solvents**

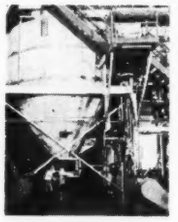
Developing New Products on Bowen SPRAY DRYERS

Patented Bowen air cooling features made possible the large production of thermoplastic and thermosetting resin powders . . .



FIRST SPRAY DRIED BY **Plaskon**

Controlled spherical shape, free-flowing characteristics and high density of spray dried Ferrites, makes possible superior performance of electrical cores . . .



FIRST SPRAY DRIED BY **Stackpole Carbon**

And, many other companies with whom Bowen has worked have pioneered with Bowen Equipment to produce a FIRST-of-its-kind product. Bowen engineers are available to work with you to incorporate Spray Drying in the production of your products. Whether you are producing a high cost quality product or a basic material in quantity where low cost is the determining factor, you should investigate Spray Drying.

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THE BOWEN LABORATORY SPRAY DRYER

We will be glad to send it — No obligation

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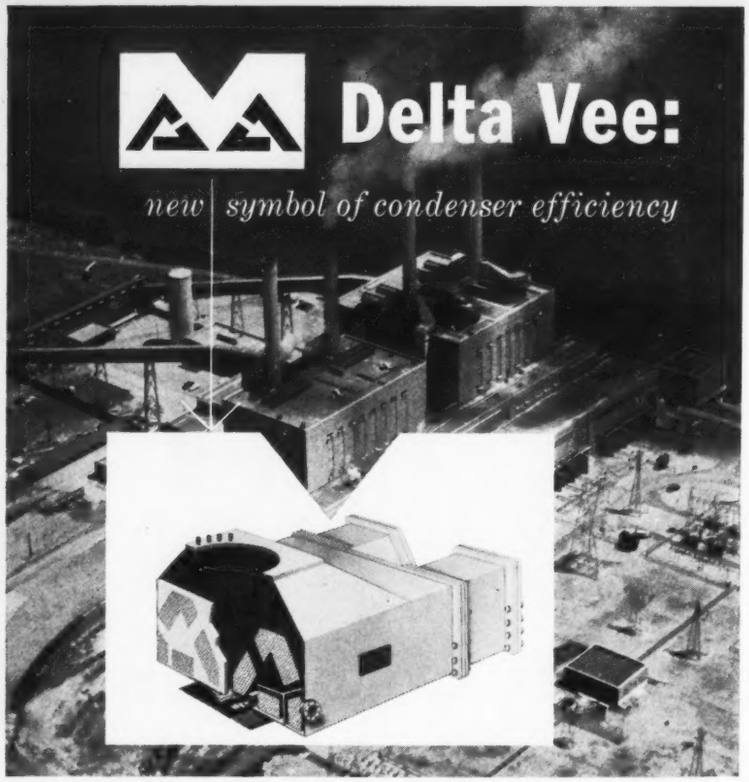
NORTH BRANCH 1, NEW JERSEY

BOWEN SPRAY DRYERS Always Offer You More!

Recognized Leader in Spray Dryer Engineering Since 1926

When inquiring check 4380 opposite last page



ONLY SWECO SURFACE CONDENSERS OFFER DELTA VEE DESIGN

The water circuit uses V-type water boxes and reversing chamber. Roughly 60% of the water feeds the main banks of tubes; the remainder feeds the secondary condensing sections and air-cooling sections at the sides of the water box.

The condensing circuit is in two delta-shaped tube bundles, one group in each half of the condenser. The two groups are mirror images. The main condensing banks are formed by the arms of the deltas; the base forms the secondary condensing sections and the air-cooling sections.

SWECO Surface Condensers are designed for prime mover service with large steam turbines. Available in sizes from 3,500 square feet and up, SWECO Surface Condensers offer these design advantages:

maximum de-aeration—from large contact-tube areas, positive steam-vented hot well.

even distribution of steam—generous admission area to tube bank reduces water and vapor pressure drop.

increased efficiency of heat transfer—condensate forming on upper tubes flows over minimum number of lower tubes, eliminating water blanketing.

compact installation—low headroom minimizes excavation or structure necessary to set condenser below turbine.

accessible for servicing—end covers are removable, divided water box permits one side of condenser to operate while the other is being cleaned or serviced. (Similar construction is available in non-divided water box design.)

SWECO enters the surface condenser and ejector field with more than forty years experience in the production of pressure vessels and heat exchangers...in thermal and mechanical design...and with complete manufacturing facilities.

Construction, operation and features of SWECO Surface Condensers are described and illustrated in brochure M-3-3. Write for your copy today.

SWECO

Southwestern Engineering Company
4800 Santa Fe Avenue, Los Angeles 58, California
Engineers and Constructors...Manufacturers

When inquiring check 4381 opposite last page

NEW LITERATURE

Traces history of sulfur — forty centuries of use

The story of the knowledge and use of sulfur that dates back 40 centuries prefaces 52-page book on company's sulfur processing facilities. Uses of sulfur and refining and processing operations are discussed. Physical and chemical properties and methods of analysis and handling are described. Tables and graphs show density, heat capacity, thermodynamics, electrical resistivity, solubility, and viscosity.

"Stauffer Sulfurs" is available on letterhead request to Stauffer Chemical Co., 380 Madison Ave., New York 17, N.Y.

Company's line of conveyors described in bulletin

Overhead belt, slat, and trolley conveyors, as well as gravity and live roller conveyors, are covered in eight-page bulletin. Features, design, and applications of different types of conveyor systems are depicted through photographs and drawings with explanatory captions.

Bul 286LG is issued by Conveyor Systems, Inc., Dept. CP, 325 S. California Ave., Chicago 12, Ill. Specify 4382 on form opposite last page.

Bulletins describe nuclear reactors

Aqueous homogenous burner reactor and power plant designed by manufacturer are described in four-page bulletin. Auxiliary system and biological shield and containment are discussed. Basic reactor plant flow diagram is included. Tank-type research reactor is detailed in separate bulletin.

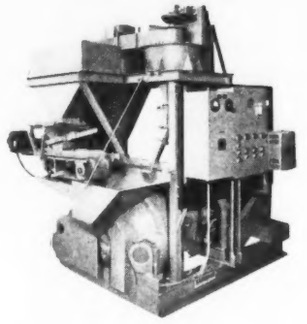
Bul N-56-8 (Aqueous homogeneous burner reactor) and Bul N-56-9 (Tank-type research reactor) are issued by Foster Wheeler Corp., Dept. CP, 165 Broadway, New York 6, N.Y. When inquiring specify 4383 on form opp. last page.

Stainless steel pipe, fittings, tube, and valves in hard-covered catalog

Specifications and descriptions for line of corrosion-resistant pipe, valves, fittings, and tube are presented in 104-page catalog. Hard-covered and bound book contains photographs, cutaway and engineering drawings, and charts to help detail company's products.

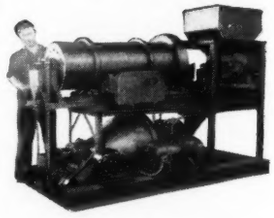
Cat 157 is available on letterhead request to Power Stainless Products Co., Dept. CP, 356 Harrison St., Passaic, N.J.

"Packaged Pulverizers"



DRY GRINDING UNIT

Make power connections only and the Hardinge dry grinding unit is ready to perform. Self-contained and portable, 7'8" high. Complete with Constant-Weight Feeder, Conical Mill, "Gyrotor" Air Classifier, dust collector, product collector and "Electric Ear" grinding control. Ideal for small commercial operations or pilot plant testing layout.



WET GRINDING UNIT

Power and water connections only are needed to put the Hardinge wet grinding unit into operation. Self-contained and portable, 6½' high. Includes Conical Mill, Counter-Current Classifier, launders, feeder, pump and "Electric Ear" grinding control.

Write for Bulletin
AH-448-13 describing
both wet and dry units.

HARDINGE
COMPANY, INCORPORATED
YORK, PENNSYLVANIA · 240 Arch St. · Main Office and Works
New York · Toronto · Chicago · Hibbing · Houston · Salt Lake City · San Francisco

When inquiring check 4384
opposite last page

Foreign Aid

Starts on page 9

"captive" US markets.

The climate for private development abroad has already been made favorable by the respective provisions of the US International Cooperation Administration (ICA). Through their facilities, foreign investments can be insured against loss through nationalization or inconvertibility of foreign currencies.

But it's the long-range return that is important. These countries will develop whether we aid them or not. When they do emerge from impoverishment, they will become large-volume consumers. In the long run, we will have a secure market if we help them now to industrialize. Some countries that we have helped put on their feet have already purchased more material from us than we have given them in aid. Israel is a good example of this.

If, on the other hand, we do not help under-developed countries, some other power will be a "big brother" to them, and if "brother's" ideology is significantly different from ours, these markets — and the people's friendship—may be lost for a long time.

A number of problems face industrialization of under-developed countries: attitudes on the part of the larger, richer nations; problems of waste; and most of all, problems of obtaining the most suitable personnel.

Attitudes we have already discussed. The problem of getting the most value for each dollar is a big one too. The ICA (includes US "Point Four" aid, which is technical cooperation) and UN programs employ several thousand persons and in 1956 spent $1.5 billion and over $100 million respectively. Here's a great opportunity for businessmen, by nature capable of getting the most from a dollar. There is a point where it does not pay to go beyond when controlling, and that's where it costs *more* than a dollar to save a dollar. Nevertheless, qualified management men, especially those seasoned in foreign operations, could improve efficiency in both these programs.

As an effective alternative, men from companies that have been successful in their foreign operations could serve as an advisory board to the Government-

Turn to page 234

Why no subscription price for this magazine?

You might think it odd that you get CHEMICAL PROCESSING without demand of a formal subscription charge. But it really isn't so strange!

See page 197.

Anaconda Arsenical Admiralty-439 Tubes being installed in the condenser at the Shippingport, Pa., Atomic Power Plant—25 miles northwest of Pittsburgh.

CONDENSER IN AMERICA'S FIRST BIG ATOM POWER PLANT USES 60 MILES OF ANACONDA ARSENICAL ADMIRALTY TUBE

The electric generating station at the Shippingport, Pa., Atomic Power Plant will add a maximum 100,000 kw of electric power capacity to Duquesne Light Company's system when it is placed in operation this year.

More significant, however, is its function of measuring the performance of the Pressurized-Water Reactor. It will help give some of the answers on how to "burn" uranium on a large scale and utilize the power economically, to guide design of future atomic power plants.

The Westinghouse Turbine-generator has a minimum rating of 60 megawatts and a maximum of 100 megawatts. It operates on saturated steam at low pressure—987,350 lb/hr at a throttle pressure of 620 Psia, for 79.3 megawatt gross generator load. It is served by a 70,000-sq.-ft. Westinghouse condenser which provides a condenser vacuum of 1.5 in Hg Abs.

The condenser has a total of 10,276 Anaconda Arsenical Admiralty-439 tubes, ⅞" O.D. x 18 Stubs' gage x 30 ft. long, with a total weight of 153,676 lb. The tube plates of "true oval shape," 153" x 213" x 1½" thick, are of Leaded Muntz Metal, each weighing approximately 12,450 lb. These, too, were supplied by The American Brass Company.

Anaconda Arsenical Admiralty-439 has for years been an outstanding favorite for condensers and heat exchangers in power stations. Its arsenic content effectively inhibits dezincification under normal water conditions.

The American Brass Company laboratories are constantly studying corrosion problems to help make condensers and heat exchangers give longer and more dependable service—are leaders in the development of alloys to help meet the problems. Arsenical Admiralty is but one of its many contributions in the field.

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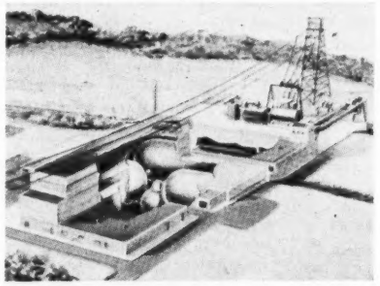

A SKETCH of The Shippingport Atomic Power Plant, cut away to show containment vessels housing the pressurized-water reactor and heat exchangers which generate steam to operate the turbine-generator. The condenser is located directly beneath the turbine-generator shown in the background.

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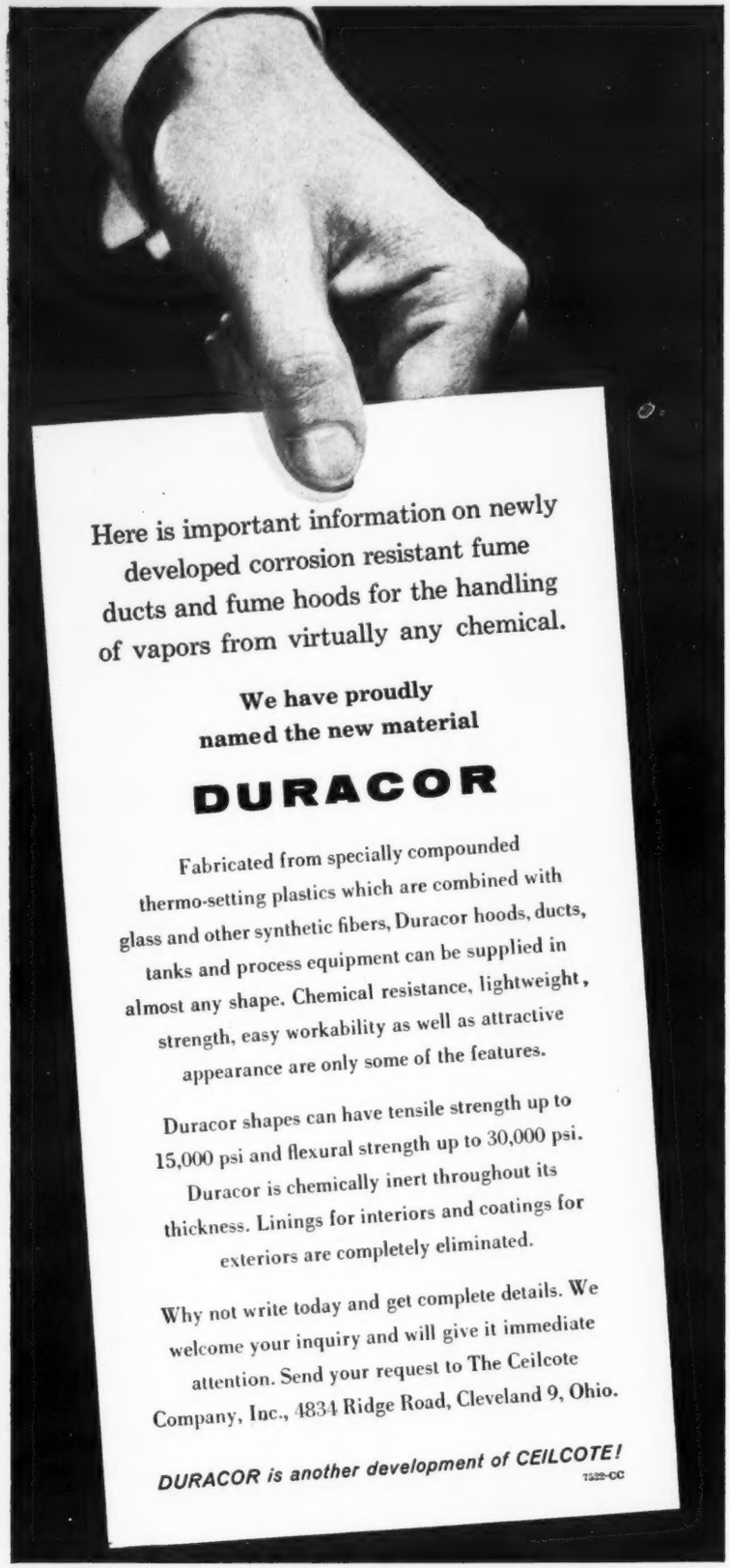
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Foreign Aid

Starts on page 9

sponsored projects if they could not go overseas themselves.

The big problem is getting the right men in the right places, and it applies to technically trained personnel even more than management. Technically trained men are the ones with the know-how. Even with all the financial aid and management talent possible, no program can even get off the ground without qualified engineers.

Extending economic aid is a cause, more than a project. It takes men with a missionary spirit. Monetary reward is not large, although it is not out of line with US Government salaries or local earnings in these areas. Salaries may run from about $4000 a year, plus expenses, at present.

A year to two spent overseas helping an underdeveloped nation get on its feet may be excellent training for a recent graduate, especially if he works under the leadership of a seasoned engineer with foreign experience. Perhaps the recent graduates' talents could be put to much better use in this way than in the way that many companies use the abilities of their newly-graduated engineers.

If the draft were revised so that a technical graduate could spend twelve months of his duty on such a program, say assigned to the UN, everyone would benefit. The engineer would obtain useful experience in foreign countries of the world that are most in need would benefit from his services. He might be far more useful for a time behind a slide rule or on the construction site, than behind a bazooka.

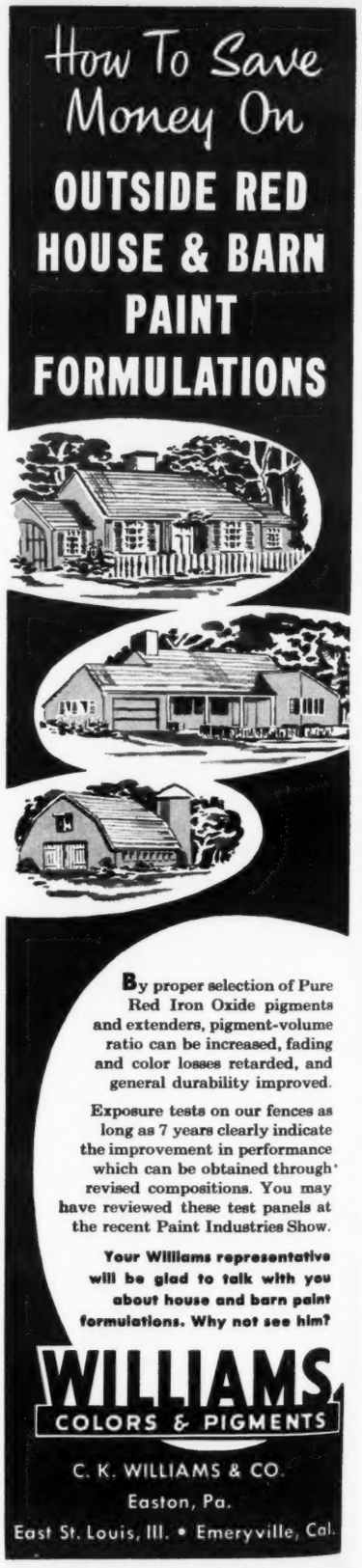
As success or failure in foreign operations depend to a large degree on "human engineering" — even *more* than in domestic operations — previous successful foreign experience should be a good indicator of a man's fitness for executive performance.

Perhaps the biggest encouragement our Government could give private industry would be for them to grant tax exemption on money earned and reinvested in foreign operations. They should also review the tax setup for income from foreign operations, and should not lump this in with domestic income taxes.

The entire UN budget is $30 million. The 1956 US Point Four budget as $1.2 billion, of which $528 million goes for surplus food disposal, and $289 million never left our country — it was used to purchase items right here in the USA which were then exported.

In India these expenditures average less than 20c per Indian aided per year. In Latin America it's been less than 40c. Where else has so little done so much?

We are forced to spend billions on weapons and war defense, but we must not lose sight of the future purchasing power of these peoples, and therefore should invest our talents and capital in peaceful ventures with common aims for all partners.
words, trade not aid. ■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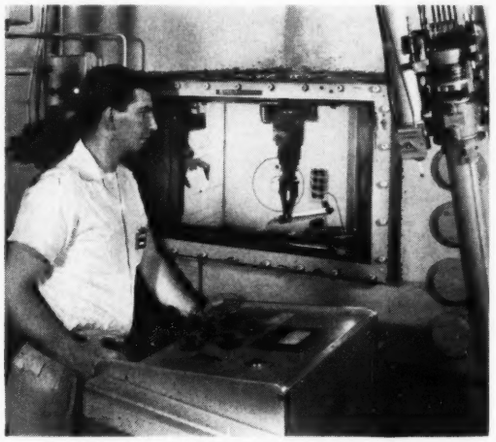
Safety Shielding

Starts on page 21

required that would provide good visibility, yet furnish complete safety to personnel while handling the "hot" materials.

Solution: In 1956, when Westinghouse completed the addition to its atomic laboratory, 36"-thick windows made of special glasses were installed in wall of each new radiation cell.

Three new high-level radiation cells were added to enable lab to study radioactive materials up to one million curies. Each of these cells measures 6 × 5′ and is surrounded by 3′-thick walls of ferro-phophorus aggregate concrete. Density of the concrete is 4.8, and the 3′ walls can attenuate 300,000 roentgens of radioactivity per hour (maximum dosage allowed to lab personnel is 0.3 roentgens per week.)



Operator looks through radiation-shielding window to watch electrically controlled hand place radiation counter near "hot" source

Each cell is equipped with either "master-slave" mechanical hands or electrically operated hands. The electrical hands can lift 750 lb vertically and 40 lb at arms-length position. Simulating the action of the human wrist, elbow, and shoulder, these tongs have eight different directional motions which can be used in several combinations. The hands make all cell contact with the uncovered samples. Arms, enclosed in plastic sleeves to prevent aerial contamination, extend from clean area into storage cells.

Each 36"-thick window used in cells weighs three tons and is composed of a combination of high-density glasses that provide as much radiation protection as the concrete walls. Each window has 12" of 6.2-density lead glass on the cold side and 22" of 3.3-density non-browning lead glass on the hot side. A 1" cover plate of 2.7-density non-browning lime glass is on the observer side. Seven

Turn to next page

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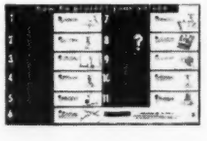
For example, the **Fig. 1040-A Valve** shown here, made from carbon steel, is rated for 10,000 psi at 150°F. Each of these valves is individually tested at 15,000 psi before it leaves the factory.

R-P&C's complete line of bar stock valves includes constructions in 12-14 chromium stainless steel, 18-8 molybdenum stainless steel and bronze. Sizes range from ⅛" to 1" in globe and angle styles with female ends, male and female ends, or male union ends. For extremely severe throttling services, R-P&C bar stocks can be supplied with stellite discs for extra abrasion resistance.

Your R-P&C distributor carries not only a complete line of bar stock valves but also a wide selection of gate, globe, angle and check valves in bronze, iron, and cast and forged steel. You will find the answer to your valve problem in his selection.



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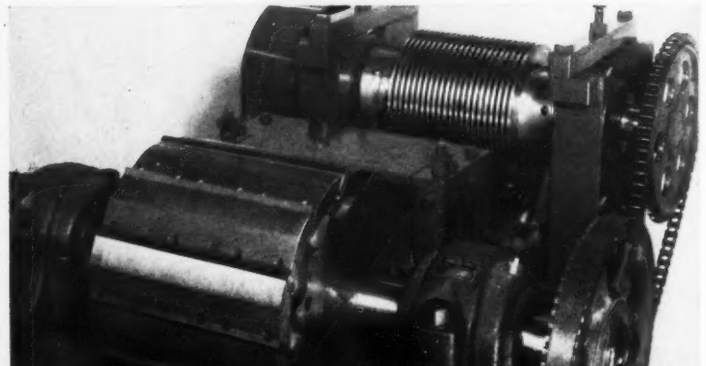

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Safety Shielding

Starts on page 21

interfaces of window are separated by a thin film of mineral oil, which greatly cuts down loss of transmittance due to surface reflections.

Each window consists of individual lights of glass in an integral 36" stepped frame unit. Stepped construction is designed to reduce total amount of glass in assembly and to prevent straight-through radiation leakage. Housing of each window is of cast iron, with the glass resting on Koroseal-covered metal spacers to prevent point loading. Glass lights or sections are held inside housing with lead wool packing. Lead wool packing is also used between wall liner and window frame.

The three different types of glass used in the Westinghouse windows all resist darkening under radiation. Two of the glasses are cerium stabilized. The third, the 6.2-density glass, has a natural tendency to resist browning. For certain energy levels, the high-density lead glass has a better shield rating than iron, even though its density is less.

Results: Radiation shielding windows have furnished complete safety to personnel at Westinghouse. Windows have successfully shielded the "hottest" materials handled by the lab, up to 300,000 roentgens or higher. Index of refraction in the glass is so great that the observer can see virtually the entire area of the cell. Optical distortion is negligible.

Gamma rays and X-rays have peculiar effects on most glasses. Lab has found that optical glass prisms used for reading vernier scales inside cells have to be replaced every two weeks. Exposure to gamma radiation darkens the prisms until the scales are unreadable. While this is true of most glasses, radiation shielding windows have not darkened under radiation.

(Radiation-shielding windows are product of Corning Glass Works, Dept. CP, Corning, N.Y. Check 4390 opposite last page.)

(Electrically operated hands are product of Mechanical Div., General Mills, Inc., Dept. CP, 1620 Central Ave., N.E., Minneapolis, Minn. . . . or check 4391 on form opposite last page.)

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. . . see page 197.

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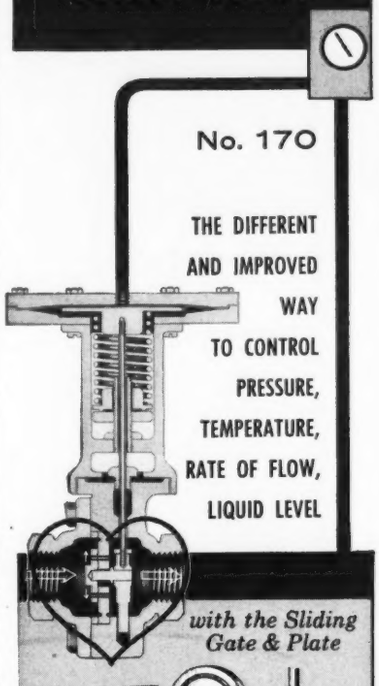

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FIG. 6061

Fig. 19,488

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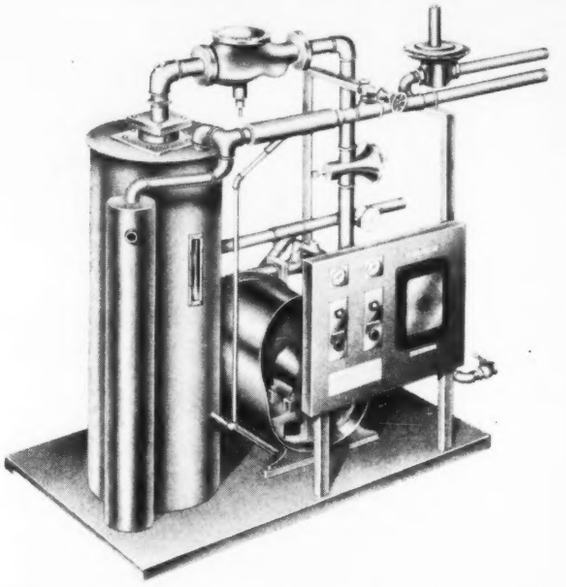

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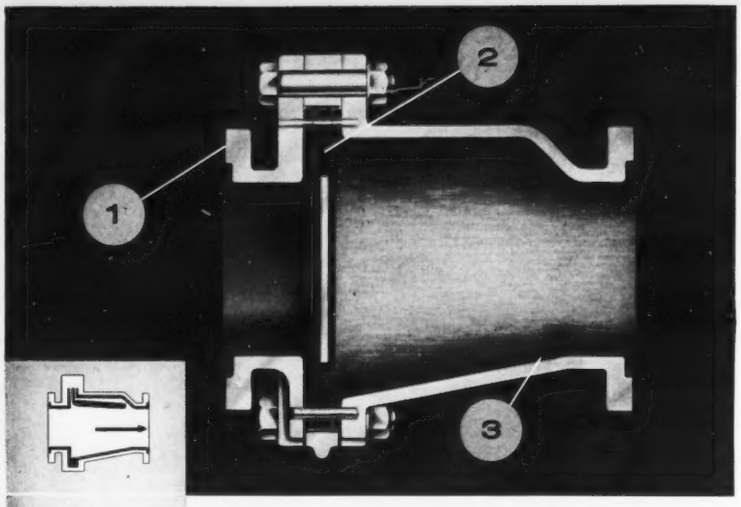

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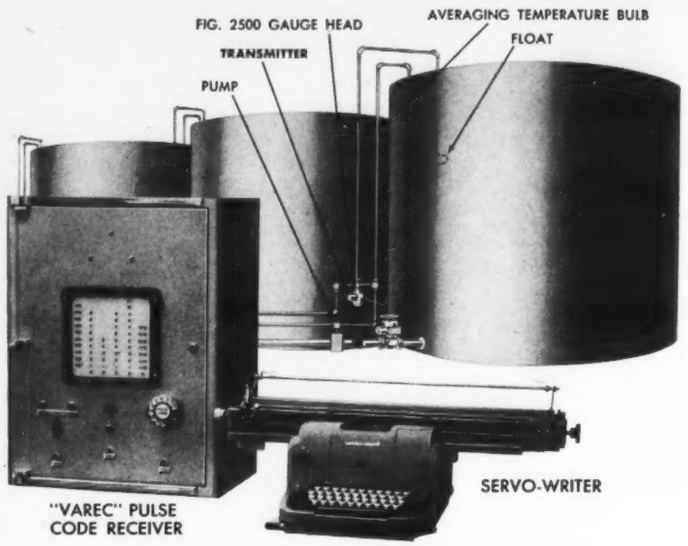

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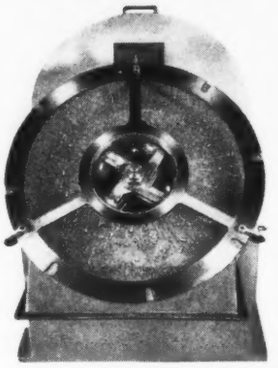

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demonstrated by even dispersion of disintegrated pulp in bowl area surrounding screen.

2. Hammer-like breaking action of rotor:
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3. Rapid grinding action between rotor and screen:
demonstrated by large, cleared screen area between rotor hammers.

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As a sanitary unit, available in 4″ to 18″ rotor diameters, it finds a wide range of applications in both food and chemical industries.

Literature on Rietz Angle Disintegrators may be obtained from Rietz Manufacturing Company at either West Chester, Pennsylvania or Santa Rosa, California.

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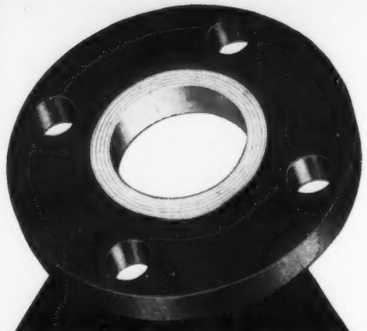

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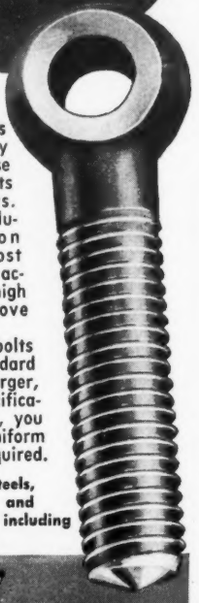

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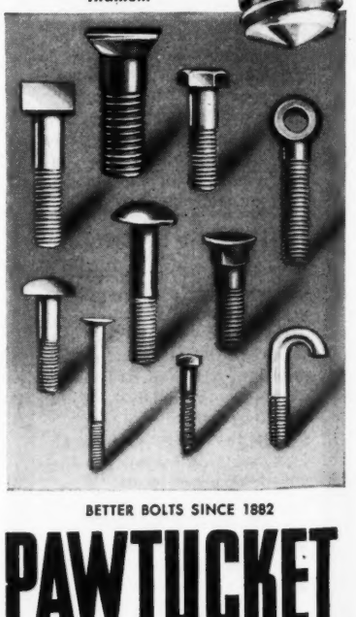

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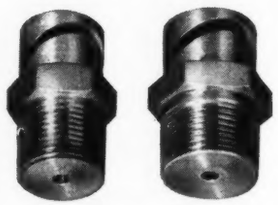

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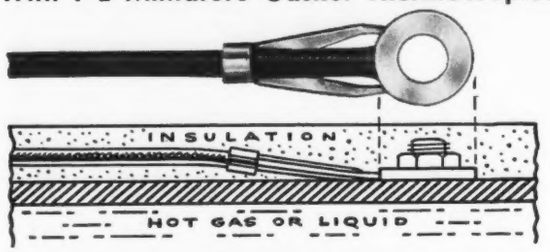
SOUTHEASTERN STATES, Chicago Office, Richard H. Putman

Fast, Accurate Skin Temperature Measurement

With T-E Miniature Gasket Thermocouples



Easily installed, T-E's fast responding, sensitive, gasket thermocouples have many applications. They provide accurate, dependable skin temperature measurement for chemical, food processing, metal working, atomic energy and many other industries.

In a typical installation, a gasket thermocouple is secured with a nut onto a bolt or stud located in the area of desired temperature measurement. This assembly may then be covered with thermal insulation. Another typical use is beneath engine spark plugs.

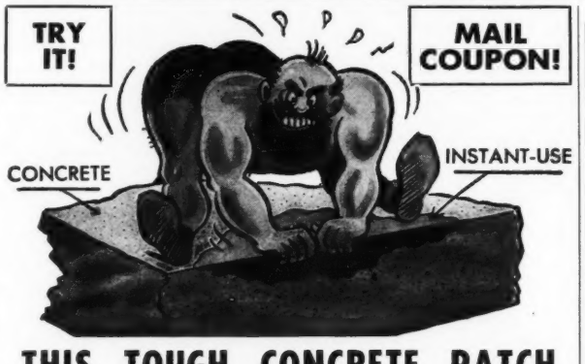
Choice of three temperature ranges covers minus 300°F. to plus 1200°F. Calibrations include either Copper-Constantan or Iron-Constantan. Standard washers are available for studs and bolts from 1/8" to 1" in diameter. A wide selection of terminals or quick-coupling plug and jack connectors to suit your needs.

Write for Bulletin 1-R.

Thermo Electric Co., Inc.
SADDLE BROOK, NEW JERSEY
In Canada—THERMO ELECTRIC (Canada) Ltd., Brampton, Ont.

When inquiring check 4407 opposite last page

TRY IT! **MAIL COUPON!**



THIS TOUGH CONCRETE PATCH SETS INSTANTLY!

Repair broken factory floors without the usual traffic tie-up. Simply shovel INSTANT-USE into hole or rut—tamp smooth—truck over! No waiting! INSTANT-USE bonds tight to old concrete . . . right up to a feather edge. It's tough. Wears like iron. Won't crack or crumble. Install complete overlay where floors are badly chewed up. Used indoors or out. Immediate shipment.

MAIL COUPON for TRIAL OFFER and FREE BROCHURE

INSTANT-USE

FLEXROCK COMPANY (Offices in principal cities)
3611 Filbert St., Philadelphia 1, Pa.

Please send me complete INSTANT-USE information, details of TRIAL ORDER PLAN and Free INSTANT-USE BROCHURE—no obligation. (Clip and attach Coupon to company letterhead).

Name .....
Title .....
Company .....
Address .....

When inquiring check 4408 opposite last page

To get more information on products—use the Reader Service slip . . . *opposite this page*

THAT'S INTERESTING

Starts on page 2

"I guess we haven't hit quite the right formula on this anti-cling compound yet."

No more cling

Clinging caused by static electricity in synthetic fabrics can be curbed. A rinse called DYP, when added to rinse water, eliminates the cling, and works on nylon and other synthetics as well as silks.

Straight from . . . the horse's blood

According to Abbott Labs publication, "What's New", how a horse runs may depend a lot on his red blood cell count. Theory was borne out in tests conducted on 207 thoroughbreds at Hollywood Park. A horse player of the future may have to check erythrocyte count and hemoglobin concentration before placing a bet. (*Denver Post*)

Do-it-yourself candles

A California firm is offering to hobbyists thin honeycombed sheets of beeswax with which to roll candles. Sheets come in different colors, no melting is required, and candles are long-burning and dripless. (*Wax Facts,* Dura Commodities Corp.)

Lining 'em up

Latest developments in axicons, a class of optical devices, can give a straight line out as far as 75 feet. Anywhere along this 75-foot range, equipment can be located to better than half a thousandth of an inch — less a fifth the thickness of a newspaper page.

. . . Fluid Power news

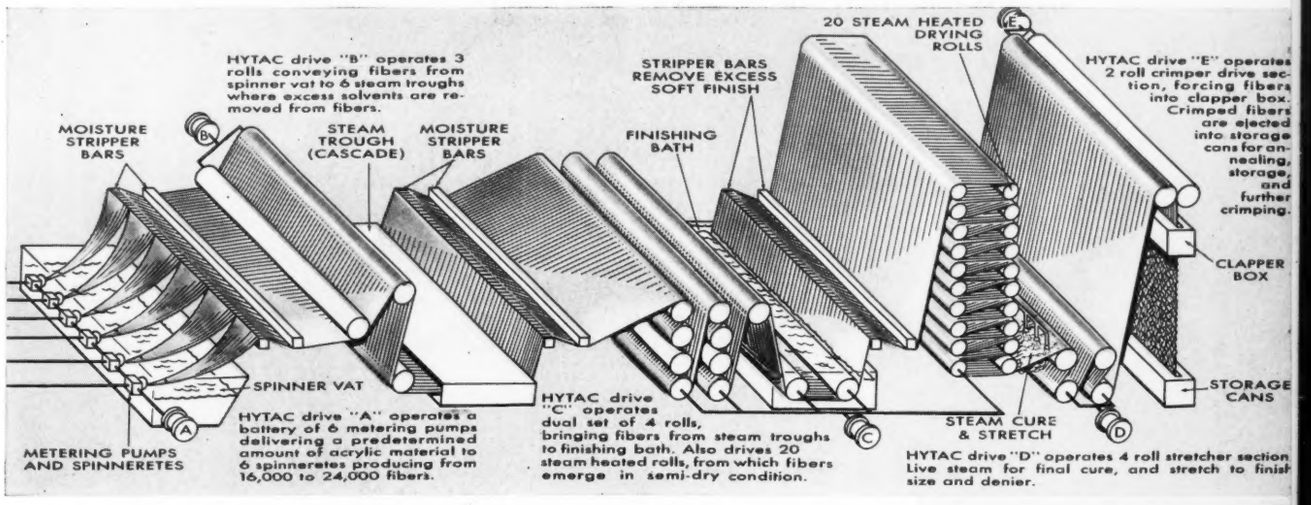
REPORT NO. 11,100 SYNCHRO-MULTIPLE DRIVE

From Oilgear Application-Engineering Files

HOW OILGEAR "HYTAC" DRIVES SYNCHRONIZE ACRYLIC FIBERS PRODUCTION

CUSTOMER: *A Large Producer of Basic Acrylic Fiber (Name withheld)*

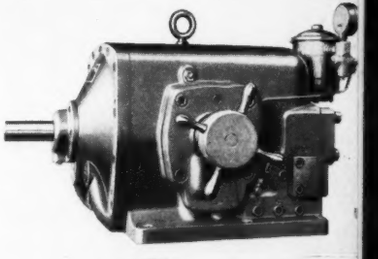
DATA: Drives for 32 machines, each for complete processing of a new, synthetic, acrylic fiber. User wants to eliminate line shaft drive, and mechanical, variable speed drive components used in pilot plant operation due to limited, inaccurate speeds, difficulty of synchronization, and slow speed changes. Production equipment requirements are: higher speeds and greater speed range; rapid speed changes; positive, smooth, accurate speed control and synchronization regardless of load variation down to ½ rpm; serviceable by non-technical personnel; safe for use in hazardous atmospheres; occupy minimum space; individual drive flexibility—for addition, removal, or separate operation; no increase of electrical power input beyond that of pilot plant.


HYTAC drive "B" operates 3 rolls conveying fibers from spinner vat to 6 steam troughs where excess solvents are removed from fibers.
20 STEAM HEATED DRYING ROLLS
STRIPPER BARS REMOVE EXCESS SOFT FINISH
HYTAC drive "E" operates 2 roll crimper drive section, forcing fibers into clapper box. Crimped fibers are ejected into storage cans for annealing, storage, and further crimping.
MOISTURE STRIPPER BARS
STEAM TROUGH (CASCADE)
MOISTURE STRIPPER BARS
FINISHING BATH
CLAPPER BOX
SPINNER VAT
STORAGE CANS
HYTAC drive "A" operates a battery of 6 metering pumps delivering a predetermined amount of acrylic material to 6 spinnerets producing from 16,000 to 24,000 fibers.
HYTAC drive "C" operates dual set of 4 rolls, bringing fibers from steam troughs to finishing bath. Also drives 20 steam heated rolls, from which fibers emerge in semi-dry condition.
STEAM CURE & STRETCH
METERING PUMPS AND SPINNERETES
HYTAC drive "D" operates 4 roll stretcher section. Live steam for final cure, and stretch to finish size and denier.

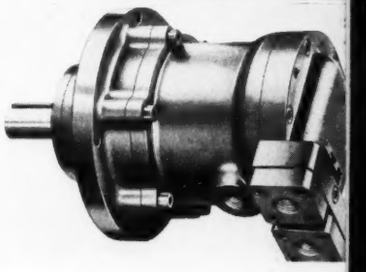
SOLUTION: Five Oilgear "HYTAC" (hydraulic tachometer) drives per machine . . . shown above as A, B, C, D, E . . . merely in basic schematic operational principle. Eight lines of recrimper drives, and four lines of final packing equipment are also Oilgear "HYTAC" equipped. User plant personnel installed, started, and adjusted the drives on 31 machines after the completion of the first installation by Oilgear personnel. These Oilgear drive and control systems are compact, completely sealed, flood lubricated, and can be remotely controlled. All five drives operate at different speeds during fiber processing. Stretcher drive "D" is most critical, as speed variation here results in changes in fiber diameter, wrong denier, and breakage. USER REPORTS—dependable, continuous, full-load operation for weeks without drifting, or adjustment; no lag when starting several sections; electrical power consumption far below initial estimates. This outstanding performance has led this user to installation of over 700 Oilgear drive components on processing machinery.

For similar practical solutions to YOUR *linear or rotary drive problems, call the factory-trained Oilgear application-engineer in your vicinity. Or write, stating your specific requirements, directly to . . .*

Oilgear type "DR-2011" variable delivery (input drive) pump with hydraulic control supplies power to . . .



. . . an Oilgear type "H-2011" constant displacement (output drive) motors. Oilgear "HYTAC" precision, "Any-Speed" drives are available in 1 to 100 hp sizes.

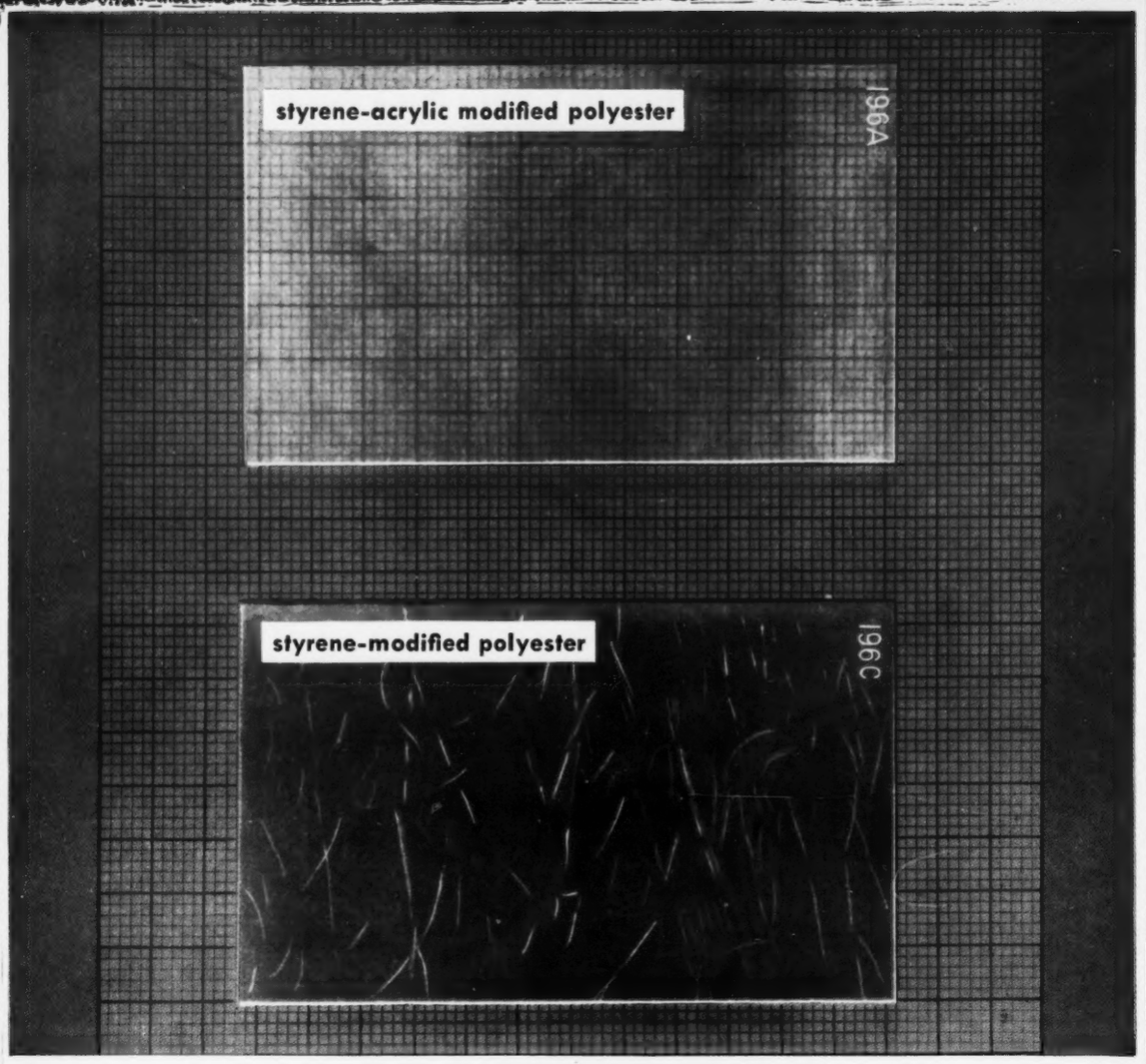


Synchronization of multiple, tandem operations; combining separate operations to handle webs soft and fragile at one point—strong at another; or continuous webs where tension affects quality . . . all need more than conventional drives and controls . . . .
. . . they need Oilgear "HYTAC" precision, "Any-Speed" drives and controls.

THE OILGEAR COMPANY

Application-Engineered Fluid Power Systems

1588 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN



POLYMERS KNOW HOW TO CONCEAL THEIR AGE

...with Rohm & Haas Acrylic Monomers

Looking at these glass fibre reinforced panels, you'd hardly suspect that both were exposed to the same Florida weather for 12 months. The one, made with a styrene-modified polyester resin, suffered surface erosion, discoloration, and fibre "splintering." But the other, made with a styrene-acrylic modified polyester resin, retained its color and surface gloss without fibre evidence. This is typical of the built-in benefits you get through copolymerization of Rohm & Haas acrylic monomers with many other monomers. The primary chemical bonds which are formed mean that the acrylates cannot migrate, volatilize, or be extracted by even the strongest solvents. As a result, copolymers remain tough and flexible longer . . . resist attack by heat and ultraviolet light. To see how acrylic monomers can improve your product, write for our detailed booklet.

ROHM & HAAS ACRYLIC MONOMERS

Methyl acrylate	Butyl methacrylate
Ethyl acrylate	Hexyl methacrylate
Butyl acrylate	Decyl-octyl methacrylate
2-Ethylhexyl acrylate	Lauryl methacrylate
Methyl methacrylate	Stearyl methacrylate
Ethyl methacrylate	Glacial acrylic acid

Glacial methacrylic acid

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